

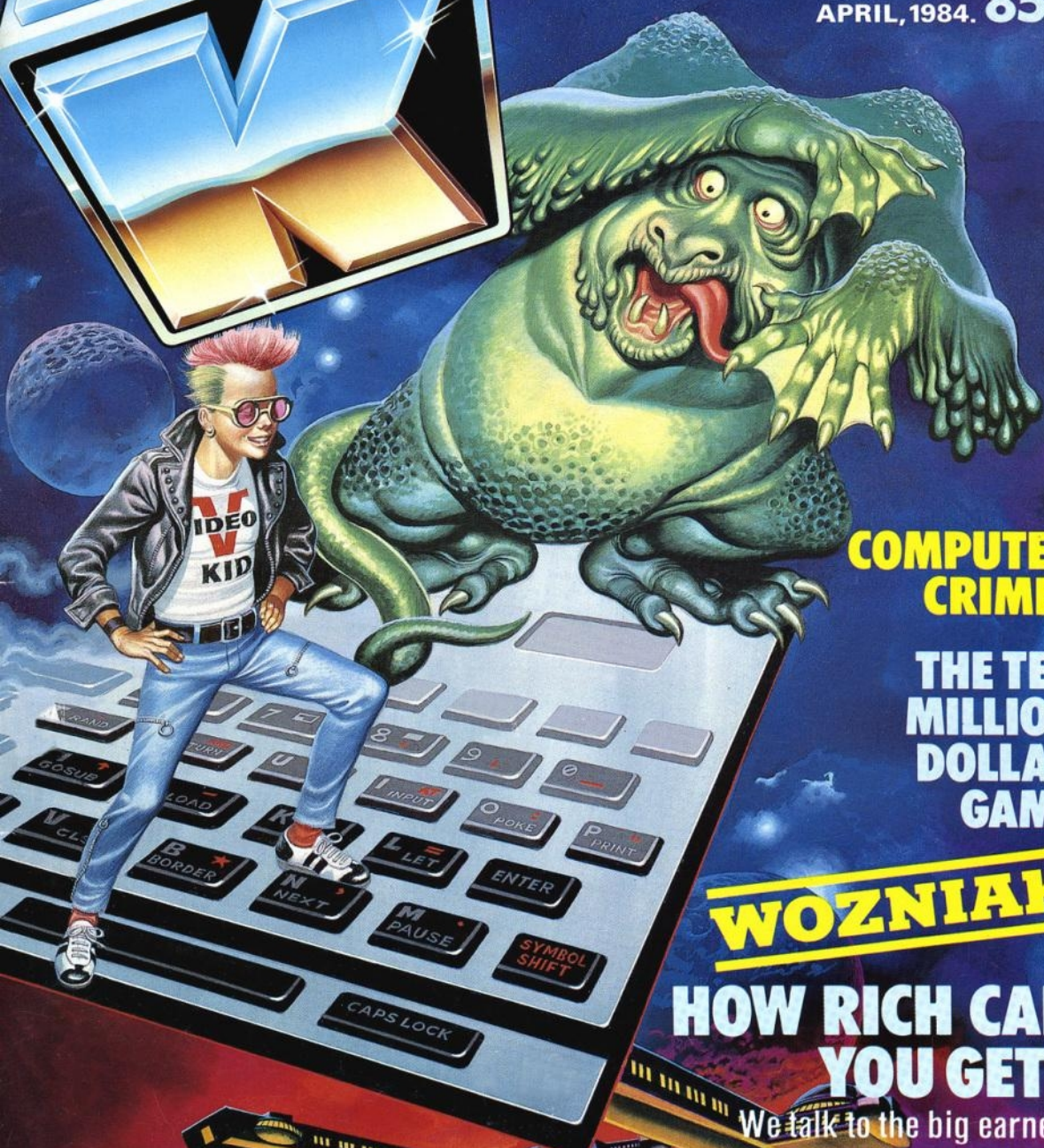
No.1



FREE CASSETTE

PLUS GAMES PROGRAMS

APRIL, 1984. **85p**



**COMPUTER
CRIMES**

**THE TEN
MILLION
DOLLAR
GAME**

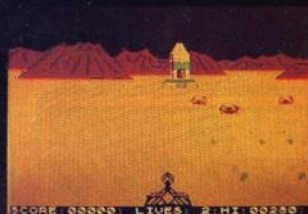
WOZNIAK!

**HOW RICH CAN
YOU GET?**

We talk to the big earners

**WIN A COLECO MODULE 3
BIG KOMPETITION INSIDE!**

Australia \$1.70. New Zealand \$2.00. Malaysia \$3.25.



LUNA CRABS
By M.J. ESTCOURT



HAUNTED HEDGES
By DEREK BREWSTER



DEATH CHASE
By M.J. ESTCOURT

Kempston Joystick Compatible

MICROMEGA

For any Spectrum

ALL TITLES £6.95 INC VAT.
SELECTED MICROMEGA PRODUCTS
THROUGH: BOOTS, GREENS, ASDA,
JOHN MENZIES, LASKYS, WIGFALLS,
RUMBELOWS, HMV, SELFRIDGES,
WH SMITHS, SPECTRUM SHOPS
EVERYWHERE AND ALL OTHER GOOD
SOFTWARE STOCKISTS

Trade Enquires

PRISM 01 253 2277
WEBSTERS SOFTWARE 0486 84152
LIGHTNING RECORDS AND VIDEO 01 969 5255
MICRO DEALER UK - ST ALBANS 34351



STARCLASH
By DEREK BREWSTER

Kempston Joystick Compatible

NEW SOFTWARE FOR A NEW DIMENSION

Micromega - Personal Computer Division - Quantec Systems and
Software Ltd 230 Lavender Hill London SW11 1LE

**BIG K
EXCLUSIVE****YORKSHIRE KEEP
TV VIDEO SHOW
UNDER WRAPS**

by Paul Walton

BEFORE THE end of the year we may well be seeing an exciting TV gameshow based on computer technology on our Saturday-evening TV screens.

Big K has learned that executives at Yorkshire Television have been developing — under top secret conditions — just such a prime-time show aimed at the family. The project has so far been called simply VTFX (Video Tape Effects — geddit?) — but will be screened, says YTV Producer John Meade, under the all-embracing title THE GAME.

THE GAME will use a standard quiz-show format but will be "themed" according to the subject matter of each particular show. The first of these is to be called THE QUEST FOR ABIGAIL, and will be a mediaeval save-the-princess theme, with dungeons, dragons etc. thrown in. Competitors will have to operate a joystick in turn — on an elimination basis — in order to get through as many as three separate screens, all linked by pieces of pre-shot film and treated before transmission with devices such as the Quantel Paintbox and the Chromakey machine. The necessary software has been developed for the project by an Oxford company, Inside Software.

**GAMES
MEN IFFY ON QL PROGS**

QUANTUM LEAP may be the name, but as Big K went to press "Quite Low-key" appeared to be the watchword of the British games producers' plans for Clive Sinclair's latest — launched in January.

Most of the companies Big K spoke to would "like to be involved" in writing games software for the QL — particularly as the 128K RAM memory and Motorola 68000 32-bit processor means there are many more possibilities for new and exciting games — but at going-to-press time software house Psion was the only manufacturer to have immediate access to the QL.

This is because Psion was intimately involved with the QL's launch (they produced four business applications which come as part of the £399 package).

Psion's project executive Peter Norman told Big K: "We will definitely be doing games for the QL — we are currently working on some projects although it is a bit too early to be more precise.

"I think the potential for new types of QL games is just enormous and we can really start thinking of new things to do — by this I am thinking of exploring further arcade, simulations and adventure areas."

He did point out that it was not until the arrival of the Spectrum that games like *The Hobbit* were created, and therefore the QL could mean a new generation of programs. He declined to say exactly when these games programs would be announced or how much they would cost.

Scouse games house Imagine Software "does plan to produce QL games" — but had problems getting hold of a prototype. Director Bruce Everiss told Big K: "We have tons of Motorola 68000 experience and we could do QL games dead easily. But although we know what the machine looks like we've been told Psion is the only company to have an actual prototype."

Things were little better at Quicksilver — although a QL manual had been obtained.

"We cannot make any definite decision about programming for QL until we get the actual machine," explained Quicksilver's Project Director Mark Eyles. "But I do think Microdrive software might inhibit a lot of the smaller companies producing software — as it would involve a large capital outlay."

LEGENDARY MILLIONS

WHAT'S a good computer game worth these days? Around £2m, according to John Peel, managing director of Legend Software. That's what super-adventure *Valhalla* is reported to have grossed so far in sales on the Spectrum version alone. Not bad for a company's first-and-only release.

"The most profitable single game of Christmas 1983," claims Peel.

Already the "computer movie" (Legend consider their animated graphics process, Moviesoft, a cut above the "graphic adventure" tag) has been translated to the Commodore 64 with improvements all round in graphics and sound.

Legend's next offering is eagerly awaited but they are playing it considerably cool. "We're not going to make the mistake of producing a *Valhalla* clone," John told Big K. "We will follow with something spectacularly new."

Moviesoft, as it appears in the next Legend game, will probably be licensed to other companies for use in their own

games. So prepare yourself for a whole new generation of adventure games where elements of the game almost take on a life of their own, regardless of what you are doing.

Flushed with the success of *Valhalla*, John Peel, crystal ball firmly in hand, gazes into the future of games software. "1985 and 1986 will, without a doubt, be the most exciting years in computer gaming," he told Big K. "With broadcasting-quality gra-



Valhalla's Peel: "Some incredible games". (Right) Some ace profits, too.

phics, massive amounts of memory through video discs and the coming of Artificial Intelligence, there will be some incredible games around."

**ENTER THE VIDGAME JUKEBOX**

VIDEO-GAME JUKEBOXES are coming to Britain's High Streets this summer — in the form of a gadget which selects take-away ROM while you wait.

The gadget is called a Romox and is made in America — where its ROM-counterfeiting potential has been controversial. The jukebox installation will be available in computer shops, where for 70 pence a time punters will be able to view a game, and, if they like it enough, to pay their money and walk away with a personalised ROM cart on a "hire-only" basis.

The Romox system will initially concentrate on Spectrum programs. It is thought that, since Spectrums will only accept ROMs by means of a special interface, these might have to be purchased or hired by the customer.



blue chip computers

PLEASE NOTE ALL OUR PRICES INCLUDE POSTAGE & PACKING
(U.K. MAINLAND ONLY.)

Software Bonanza

WESTERN EUROPE + 10%
ELSEWHERE + 15%

**We pride ourselves on a fast delivery
& customer satisfaction**

**AUTHORISED
TEXAS INSTRUMENT
DEALER**

TEXAS TI 99/4A
SPEECH SYNTHESIZER £ 34.95
EXTENDED BASIC 39.95
TERMINAL EMULATOR 39.95
SPEECH EDITOR 14.95
EDITOR ASSEMBLER 55.95
JOY STICKS 14.95
TI LOGO II 59.95

CASSETTE RECORDER
Guaranteed to load and save 25.95
ALIEN ADDITION 10.95
METEOR MULTIPLICATION 10.95
DEMOLITION DIVISION 10.95
ALIGATOR MIX 10.95
DRAGON MIX 10.95
TOUCH TYPING TUTOR 21.95
MINUS MISSION 10.95
NUMERATION 1 7.95
DIVISION 7.95
MULTIPLICATION 7.95
ADDITION SUBTRACTION 1 10.95
MUSIC MAKER 14.95
EARLY READING 10.95
BEGINNING GRAMMAR 10.95
EARLY LEARNING FUN 10.95
CHESS 26.95
CHISHOLM TRIAL 7.95
INVADERS 14.95
PARSEC (Speech) 19.95
MUNCH MAN 19.95
ALPINER (Speech) 10.95
CAR WARS 10.95
TOMBSTONE CITY 10.95
CONNECT 4 10.95
HUSTLE 10.95
ATTACK 10.95
5-A-SIDE SOCCER 10.95
HUNT WUMPUS 10.95
VIDEO GAMES 1 10.95

NEW THIS MONTH
OTHER ADVENT 5.95
CASSETTE GAMES
MINER 99ER TI BASIC 5.95
MATRIX BLASTER TI BASIC 5.95
FROGGER TI BASIC 5.95
BOBOPODS TI BASIC 5.95
FUN PACK TI BASIC 5.95
HUNCH BACK HAVOC TI BASIC 5.95
BLACK TOWER TI BASIC 5.95
TROLL KING TI BASIC 5.95
DADDIES HOT ROD TI BASIC 5.95
FROGLET EXTENDED BASIC 9.95
TOAD GRAPHICS EX-BASIC 8.95
ADM CONTROL EXTENDED BASIC 9.95

KONG EXTENDED BASIC 9.95
BOUNCER EXTENDED BASIC 9.95
DIABLO EXTENDED BASIC 9.95
PAKMAN 19.95
DONKEY KONG 24.95
DIG DUG 24.95
ROBOTRON 19.95
CENTIPEDE 19.95
DEFENDER 19.95
STAR GATE 19.95
PROTECTOR 2 19.95
PICNIC PARANOYER 19.95

ATARI 400/800
SUB COMMANDER 31.95
JUMBO JET PILOT 31.95
FIGURE FUN 10.95
ORIC ATTACK 31.95
RIVER RESCUE 28.95
CARNIVAL MASSACRE 28.95
KILLER CLIMB 28.95
COMPUTER WAR 31.95

ATARI 400 600XL 800
ZAXXON 14.95
DIAMONDS 9.95
HYPERBLAST 9.95
BATTY BOULDERS 9.95
CAPTAIN STICKY'S GOLD 9.95
CAVE RUNNER 9.95
O'REILEY'S MINE 9.95
AIR STRIKE 9.95
FIRE FLEET 9.95
CRAZY COPTER 9.95
BOMBASTIC 9.95
JET BOOT JACK 9.95

VIC 20
RIVER RESCUE 19.95
MUTAN HERD 19.95
4th ENCOUNTER 19.95
SUB COMMANDER 28.95
MIND MADDNESS 19.95
TANK COMMANDER 19.95
MINI KONG 6.95
MULTITRON 7.50
COMPUTER WARS 7.95
WACKY WAITERS 6.45
CATERPILLA 6.45
CRAZY KONG 7.95
BRIDGE MAN 6.50
SKRAMBLE 7.50
FRANTIA 6.45
BEWITCHED 6.45
CATCHA SNATCHA 6.45
GRIDRUNNER 7.75
MATRIX 7.75
JET PACK 7.45
SPACE SWARM 6.45
FROGGER 6.95
PAKMAN 19.95
DONKEY KONG 24.95
DIG DUG 24.95
CENTIPEDE 19.95
DEFENDER 19.95

COMMODORE 64
FALCON PATROL 7.95
SCRAMBLE 7.95
THE HOBBIT 14.95
HEXPERT 7.95
MOON BUGGY 7.95
3D TIME TREK 7.95
SIMONS BASIC 47.95
HOVER BOVVER 7.50
MATRIX 7.50
MUTANT CAMELS 7.50
GRIDRUNNER 7.50

COMMODORE 64
HUNCHBACK 7.25
O'REILLY'S MINE 8.95
GALAXY 7.95
JUMPING JACK 8.95
QUASAR 7.95
BLUE MOON 8.50
SUPER PIPELINE 8.50
CRAZY CAVEMAN 7.50
SIREN CITY 7.95
TWIN KINGDOM VALLEY 9.95
ARCADIA 5.95
PAKMAN 19.95
DIG DUG 24.95
ROBOTRON 19.95
CENTIPEDE 19.95
DEFENDER 19.95
STAR GATE 19.95

SPECTRUM
VOLCANIC PLANET 7.95
BLOCKADE RUNNER 7.95
RIVER RESQUE 7.95
GOLD RUSH 7.95
ROAD RACER 7.95
LUNAR JET MAN 5.95
ALCHEMIST 6.45
MANIC MINER 6.45
PINBALL WIZARD 7.95
ATTIC ATAC 5.95
ANT ATTACK 6.95
FLIGHT SIMULATIONS 7.75
WARLOCK OF FIRETOP MOUNTAIN 6.50

BARMY BURGERS 6.45
WINGED WARLORDS 6.45
HUNCHBACK 7.75
TRANS AM 5.95
JET PAC 5.95
ZOOM 6.45
DIGGER DAN 6.45
PAKMAN 14.95
MS PAKMAN 14.95
GALAZIAN 14.95

**IF YOU REQUIRE
SOFTWARE OR
HARDWARE NOT
LISTED NOW OR IN
THE FUTURE RING
OUR HOT LINE
(0942) 322543 FOR
AN IMMEDIATE
QUOTE FOR ANY
POPULAR HOME
MICRO.**

TO: BLUE CHIP COMPUTERS, 16 Clapgate Lane, WIGAN.

Please send me

Name

Address

Tel.

I enclose a cheque/p. order to the value of £

SEND CHEQUE OR POSTAL ORDER NOW TO:

BLUE CHIP COMPUTERS, 16 Clapgate Lane, Goose Green, Wigan WN3 6RN

STATING NAME, ADDRESS, TEL NO. & GOODS REQUIRED.

OR PHONE TELE SALES ON WIGAN (0942) 495753 WITH YOUR ACCESS

BARCLAY CARD NO.

*No Monies banked until goods are despatched.

GOODBYE TO THE BIG 'I'?



MYSTERY SURROUNDED the future of the Intellivision games system as Big K went to press.

Despite official denials that Mattel Electronics UK — the British end of the American parent company — have closed down, sources within the industry were adamant that the company has virtually ceased to exist in Britain.

Mattel's troubles began two years ago, with a series of ill-timed and badly-thought-out moves designed to get the company into the home computer business. The result was Aquarius: a cheap system with useful graphic abilities which was widely criticised for its low RAM.

Despite last-minute price-cuts, Aquarius has so far failed to sell in serious quantities and as a result Mattel pulled out of the project before Christmas.

Owners of the Intellivision games system (and possibly Aquarius) are therefore facing the serious possibility of a lack of future software and expansion peripherals.

The company were not available for direct comment as Big K went to press, though a spokesman for their PR company insisted that "while Mattel has been drastically reducing its plans due to the cancelling of Aquarius, rumours of a total closedown are not true".

THE FIRST adventures to be produced like films rather than programmed like games are coming from Apocalypse Software: **Dreadnought Disaster**; and **The**



ARCADE CLAMPDOWN IN THE OFFING

PEOPLE UNDER 18 may be banned altogether from arcades if political proposals receive the backing of the Government. John Wheeler, MP for Westminster North, last month led a deputation to Home Office Minister of State Douglas Hurd. The deputation — which claims to be acting on behalf of many inner-city councillors — says that arcades encourage truancy, gambling fever, narcotics addiction and many other evil phenomena. Wheeler wants the Home Office to tighten up its licensing laws in conjunction with local authorities so that the glittering, electronic sinks of iniquity can be severely controlled.

Proposed controls? A wholesale ban on school-age punters; restrictions on the numbers of machines; and overall limits on the numbers of arcades in any given locality.

Measures of this sort have already been proposed — and in one or two cases, adopted — in some of the dotter American States, notably

ONE EVERY 27 SECONDS

A BIG MAC delivered every 27 seconds — so promises mighty Apple for their new Macintosh personal hamburger, sorry, computer, launched at the end of January. A \$20 million purpose-built, 160,000 square foot factory has been built in California just to crank out Macs for the masses. Integrated



computer control systems, automated storage and retrieval systems and robot vehicles enable large-volume production to be carried out at the plant with a staff of only 300 people.

The Macintosh, originally thought to be Apple's stab at the "quality bargain basement" market, turned out to be little more than a scaled-down Lisa with a hefty price tag of around £1,800. For that you would get an extremely neat-looking unit with built-in black and white monitor, 3½-inch disc drive, 64K ROM and 128K RAM through a 32-bit MC68000 microprocessor (as used on QL). The only external devices are a keyboard and mouse controller. A large amount of business-orientated software (word processor, graphics, database, etc.) is included in the Macintosh and easily accessed by use of the mouse.

Mystery of Arkham Manor.

David Agulnik, the Apocalypse director who doesn't program at all — "because I'm lousy at it" — revealed how the Software Studio approach and language called ALANG has brought "the movies to your micro."

"In **Dreadnought Disaster**, the Earth has been destroyed by nuclear war, and a few people have survived thanks to being in outer space at the time. Mars becomes a new habitable planet, because the polar caps there have melted. You're on a pirate ship, it crashes into an ocean liner. This liner is the **Dreadnought** and you become a fugitive on there: but you have to get off or get out of it before it sinks," he said.

But the best is yet to come. "**The Mystery of Arkham Manor** is

a horror adventure set in the 1920s: it's about strange hauntings that take place there. You're a reporter, Pete Trout, a Sam Spade character but more humorous. Your job is to investigate the story, without getting caught by the ghosts and other things."

These adventures are 50:50 text and graphics, with a liberal use of colour. On every well-known machine, or in other words the top 5/6, these are classy but expensive games (going on for £10-£15). And because they're "produced" and not "written", Agulnik reckons that they appeal to "the head and the heart".

The hidden secret? Apocalypse's designers all write an adventure in the ALANG, or Adventure Language, which gives Agulnik the ability to assist in the action. Hey-A!

ON-LINE News



Indiana. As a result in these areas the arcade machine industry has cut back on the flow of new titles, claiming that the cash returns don't justify continued spending on leading-edge technology. Similar moves have also been made in large Japanese cities.

We'll keep you posted.

CLOAK AND DAGGER DEPT.



THESE BRITS HAVE HAD THEIR CHIPS!

BIG K, ACORN AND THE HUNGARIAN CONNECTION

IF BBC computers are still rolling off the production lines today, it's no thanks to Big K staffer Paul Walton, who last month innocently precipitated a crisis which almost led to Acorn's supply of 6502 chips being cut off at source by the US Government.

It all started when Walton, 24, writing for another computer magazine in a freelance capacity, casually mentioned that the BBC Microcomputer (made by Acorn) was on sale in Budapest shops.

Sleuths at the US embassy — who apparently read each and every computer mag published (and good luck to them) — picked up this mention, checked the 6502 against the list of high-technology parts still exportable to Warsaw Pact countries in the light of the Reagan administration's post-Afghanistan crackdown... and found that it wasn't there.

With Walton's help, a desperate Acorn Computers then tracked down the person responsible for shipping Model Bs to the Iron Curtain.

The US Government curb seemed even more bizarre, says Walton, when it turned out that both Sinclair Spectrums (Z80 CPU) and the all-American Commodore range (also 6502) were being openly sold in the same Budapest stores.

Acorn have now been relieved from the threat of a bignix on their chip supply, after giving assurances that they will tighten up on their controls.

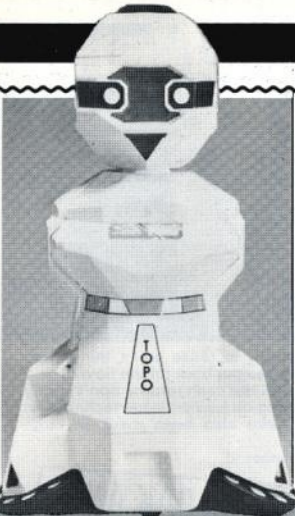
ROBOT SEE, ROBOT DO.

TOPO IS an Androbot, and Androbots are said to be the very thing that every home needs — which is fine if you happen to have a spare £1,500 hanging around to buy TOPO. For those with a smaller pocket little brother FRED, whose main asset is the ability to hold a pen and draw pretty unamazing outlines, costs a mere £200. Like TOPO he is controlled by a computer or a joystick and also a portable infra-red controller. BOB comes at the top of the range and will have (he's still in the pipeline) a 16-bit processor built in with anything up to several megabytes of memory as well as his own operating system.

At first sight these robots might appear to be a bit of a heist, as so far there is little software for them, and other extras like attachments such as arms for holding odds and ends or devices to go upstairs are likely to cost more.

But — says Bob Denton, managing director of Androbot's U.K. distributor Prism — the lack of software means users will be able to program them to do all kinds of activities. Some software is already out for Apple computers and packages are soon expected to link Commodore 64s and Spectrums to the mechanical newcomers. In other words it's all left to the public at the moment to sort out what's what.

Anyway Prism seem convinced that it won't be long until these Androbots can usher in a new era of *Upstairs Downstairs* by taking over all sorts of household duties. Big K? We're going to wait until BOB can chase hot news stories before committing ourselves.



HARDWARE WAR HOTS UP

THE BATTLE between US and British manufacturers for the "affordable" end of the micro market — the so-called Gaming Zone — takes on a new fierceness this spring with the launch of a whole fistful of new machines, some American, some British.

The American contenders are the IBM pc Jr. (Peanut), the ColecoVision Adam system and the more powerful additions to the Atari XL range. Heading the British list are the Sinclair QL (see page 3), the all-new Elan, the Memotech MTX range, and the Oric II Atmos.

The Elan and the Memotech MTX512 both feature 64K RAM. Atmos — being essentially similar to Oric I except for the full-stroke keyboard and the widely-publicised new ROM operating system — holds to 48. Prices are comparable with the Memotech weighing in at £315 for the 64K model, the stylish, stereo-sound Elan at slightly less than £200, with the Oric Atmos now on the shelves for £170.

Considering that the advanced games facilities of the Memotech are to some extent belied by the "executive" look of the machine itself — an approach shared by Sinclair for the QL design — the laurels for style and overt innovation have to go to Elan: a built-in joystick for cursor control; sharp, aggressive lines; snappy colour-coding on the keys, and — best of all from the point of view of software writers — stereophonic sound, thereby introducing new possibilities for sound in games packages.

The American invaders are led by the IBM pc Jr., with its unique system of infra-red linkage between keyboard and CPU. CBS-Coleco are widely tipped to be the second runner (only to IBM) in overall US sales, and flagship of the range is the stand-alone Adam system. Finally, Atari are currently launching the 800XL, 64K RAM machine, with the 1450 XLD still to come.

ORIC GAINS KEYS, NEW ROM



FOLLOWING current trends towards full-size keyboards with home computers, Oric has followed suit with its 48K Atmos — which comes complete with a snazzy new keyboard of course — that is selling for £170.

The red and black Atmos update the Oric I which sold over 160K during 1983.

Its main features are an enhanced ROM operating system (traditional Oric programs will still run on it though) and the Hitachi 320K three inch disc drives, which should cost

around £250 for the drives, disc operating system and power supply.

Oric has fortunately remembered however that some users will prefer to stick with cassettes and has worked on improving the cassette loading. The Oric four-colour printer has also been updated as far as its plastic case is concerned to tie in with the aggressive image of the Atmos, and Oric stresses the Atmos's manual is now really simple and easy to use as it has been published through Pan.

BARRY'S CHIP SHOP SHUTS



THE CHIP SHOP. BBC Radio 4's first dose of micro lever, comes to the end of its ten-week run on Saturday, March 17.

Auntie Beeb's venture into the white heat of technology seems to have been a resounding success. A combination of popular TV presenter Barry Norman, a lively style, the current massive interest in computing and the promise of free software (more of which later) have scored a reaction that has amazed even the programme's producer, Trevor Taylor.

"Overwhelming," he said when quizzed by Big K about reaction to the series. "The phone keeps ringing all day." Before the first Chip Shop even hit the air-waves over 12,000 calls had been received at Broadcasting House. After the second programme had gone out the phone continued to ring and the mail room began to be flooded out with over 40,000 enquiries, mainly about the show's unique "takeaway" service — a method of downloading software off-air.

Using a system called Basicode 2 developed by the Dutch broadcasting system NOS, The Chip Shop was able to broadcast programs that could be understood by several different makes of microcomputer. "It's a kind of computer 'Esperanto,'" explained Trevor Taylor.

However, the promise of "free software" becomes a bit hollow when you're told that, to get the off-air programs into your micro a special Basicode 2 interpreter cassette, price £3.95 (including post and packing), had to be sent for. Initially a dozen machines were catered for with a final total of around 20 micros on the system.

The last programme in the series, a live special from "Silicon Valley" in California, is sure to start speculation as to when, or if, there will be a second series. Trevor remained non-committal on that point. "It's being considered," was all he'd say.

GARBAGE IN, GARBAGE OUT

DESPITE glee and happiness from Oric over the success of the Oric-1 upgrade, our Man With The Misty Contact Lenses and The Solder Stains On His T-Shirt swears blind that, contrary to impression, existing (Oric-1) m/c programs will — with very few exceptions — NOT RUN on the Atmos. Oric, however, have no Atmos fear (ouch), since as they point out, programs in Basic will run and run...

A New And Dreadful World Department: Melbourne House are so thrilled (it says here) with the theme music that accompanies *Terror-Daktal 4D* that (gulp!) the swine are considering (no, I can't go on) releasing it AS A SINGLE! Could this possibly catch on? Do we want it to? Will Elan owners be snuffy because their stuff will be in stereo? Will Spectrum owners now be able to hear their machines' alleged sound? Will the centre of the business move to LA? Will Rod Stewart record "The Best of the Atari VCS?"

Throw away your manual: *MasterClass* (the video people) have released a series of hour-long cassettes which unravel the ins and outs of graphics and games for the BBC and its little sister, the Electron. Tapes include three games on the audio track, which can be down-loaded to a computer via a cassette recorder... Yes, there's a lot of this self-help about: Melbourne House have now added to the Overall Games Designer Package Situation. We already have *Scope*, *Fifth* and *The Quill* — to name but a few — now we have *Draw* (Spectrum) and *Hurg* (ditto, but games-orientated). Who'll be first with a piece of software that helps you write software to write software to... stop it.

Finally, a serious note: E Flat.

GRAFPAD

...for as many uses
as YOU
can imagine!



BBC MODEL 2 • SPECTRUM COMMODORE 64

With Grafpad you can now add a new dimension to your computer enjoyment, but most important, it helps you create your own application programmes by the simple use of the Grafpad!

The Grafpad comes complete with a cassette comprising two programmes.

THE FIRST PROGRAMME

displays the co-ordinates of your screen area. The co-ordinates are based on the screen with a grid size of 1023 x 1279 pixel, also in the Grafpad giving you a grid size of 320 x 256 pixels!

THE SECOND PROGRAMME

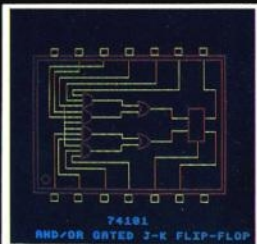
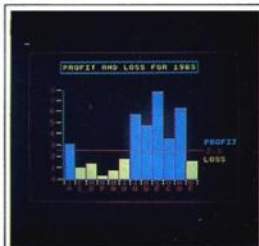
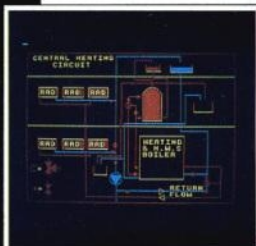
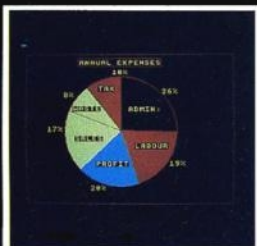
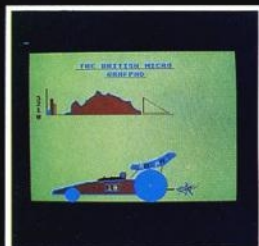
provides you with the utilities for circles, squares, triangles, free-hand, erasing line-drawing etc, and of course, full "Fill-in" facility in 16 different colours by the simple use of the pen!

Draw from a simple apple to a computer circuit - store in cassette or disk, perhaps transfer direct to a printer - in black and white or full glorious colour!

Purchase unique C.A.D. (Computer Aided Designs) programme and add further enjoyment and professionalism to your computer designs!

The Grafpad comes complete with Operational Manual, Programmes, The Grafpad and Pen and it simply plugs in your computer.

(Size: 25mm height x 55mm width x 260mm depth)
Weight: 1.2 kg (Gross)



HOW TO ORDER:

BY TELEPHONE:
If you are an American Express, Barclaycard, Diners Club or Access Card Holder simply telephone us giving your Card No., Name, Address and item(s) required and your orders will be dispatched within 48 hours!

BY POST:
Simply fill in the coupon, enclosing your cheque/P.O. made payable to: BRITISH MICRO, or use the special section for Credit Card Holders, and post to the address below. Please allow 14 days for delivery.

(The above designs were drawn by a 12-year-old at our showrooms!)

- DEALER INQUIRIES WELCOMED
- SPECIAL DISCOUNTS FOR EDUCATIONAL AUTHORITIES

BRITISH MICRO

A HEGOTRON GROUP COMPANY

Unit Q2, Penfold Works,
Imperial Way, Watford, HERTS WD2 4YY
TEL: (0923) 48222. TELEX: 946024



Post to: BRITISH MICRO, UNIT Q2, PENFOLD WORKS
IMPERIAL WAY, WATFORD, HERTS. WD2 4YY

Please send me Grafpad for:

☐ BBC MODEL 2 ☐ SINCLAIR SPECTRUM ☐ COMMODORE 64
(Please tick)

Qty.	Item	Ex. VAT	Inc. VAT	Total
	Grafpad Complete	£125.00	£143.75	
	C.A.D. Programme	£18.00	£20.70	
Postage, Packing & Insurance				£5.00
TOTAL				£

I enclose my cheque/P.O. for £.....

I prefer to pay with my American Express, Barclaycard, Diners, Access Card
(Please cross out whichever is not applicable)

CARD NO. _____

SIGNATURE _____

NAME _____

ADDRESS _____

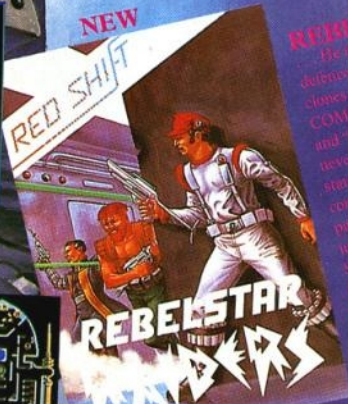
Address above must be the same as card holder.

REBELSTAR



NEW

RED SHIFT

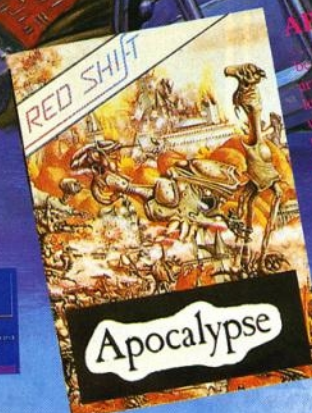


REBELSTAR RAIDERS

...He manipulated some keys and the "MONOBASE" defenses "Blas Prime" (then the screen ... The main "COMP" really did a perfect job ... "STARLIGHT" and "FREEDREAM" were all he had! Now, in never, Jo Capricorn thought ... He punched the starsystem coordinates in the supervisory computer and in a silent "Thud" his ship jumped in to light speed. The Battle had begun! Superb Graphics — Amazing Detail! Descriptive Sound — SPECTRUM 48K £9.95



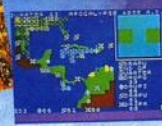
RED SHIFT



APOCALYPSE

...some hard negotiations had to be made before using the machine arms — The 4 main on screen weapons looked convincingly realistic — what was could break out and make a game of it — this was, after all, a game of thought — For SPECTRUM 48K — £9.95

Expansion kits for Spectrum 48K (Ask for other options available) (Microdrive version available by)

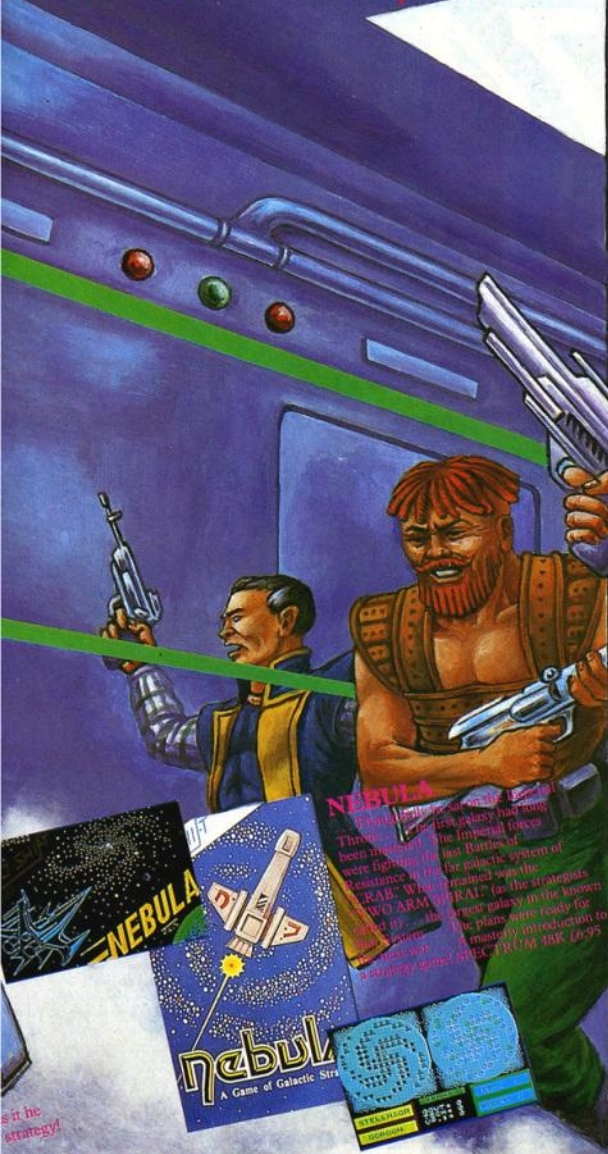


REDSHIFT LTD
12C MANOR ROAD
STOKE NEWINGTON
LONDON
N16
TEL: (01) 800 1333

Apocalypse is produced under licence from the Games Workshop Ltd.

EMS

RAIDERS LAUNCH...



NEBULA
 From the creators of the first galaxy war game, *Throne*, the first galaxy war game has been improved. The Imperial forces were the first to be introduced in the far galactic system of Resistance in the far galaxy was the "RAH" who remained as the "WGO ARM" (RAH) (as the strategists called it) ... the first galaxy in the known galaxy system. The plans were ready for the next war. A strategy introduction to a strategy game! SPECTRUM 48K £6.95

*Distributors, Multiple Store and Retail Shop inquiries invited

HOW TO ORDER

You may purchase any of the items listed by cheque/P.O. All you have to do is fill in the details in the coupon enclosing your cheque/P.O. made payable to REDSHIFTER LTD and your order will be despatched within 7-10 days. All prices inclusive of 15% VAT and P & P.
 OVERSEAS ORDERS — Please add £0.50 per item ordered.

Post to; REDSHIFT LTD, 12C MANOR ROAD, STOKES NEWINGTON, LONDON N16.

Please send me the following items; (tick item required)

- | | |
|--|--|
| <input type="checkbox"/> REBELSTAR RAIDERS
(No. Req.....) | <input type="checkbox"/> APOCALYPSE
(No. Req.....) |
| <input type="checkbox"/> NEBULA
(No. Req.....) | <input type="checkbox"/> Please send details on
Apocalypse and other games. |

I enclose my cheque/P.O. for £.....

NAME

ADDRESS

TEL: (Day) TEL: (Eve)
 Please allow 7 to 28 days for details on Apocalypse and other games.

THE NEXT WINNER FROM REDSHIFT
 Time Lords
 First Empire

IN THE MAKING!



DOCTOR SOFT ADVANCED SOFTWARE

DOCTOR SOFT
258 CONEYGREE ROAD
PETERBOROUGH
PE2 8LR

747

Cockpit view, pilot written, instrument & visual 747 Flight Simulator. Banking & pitching 3D outside view of Horizon/Runway (Heathrow/Gatwick). 7 Nav points with continuous Navigation computation. Joysticks or Keyboard option, briefing program, map, notes & flight plan. Demonstration approach, 4 colour — mode graphics & sound.

Only £8.95 inc. VAT & PP (Disc £11.95)

GORF

(PURE MACHINE CODE, ARCADE QUALITY)
The first BBC version of this superb machine code Arcade favourite! 4 widely different screens of high speed action: Invaders, Laser attack, Firebird, & Mothership, all in smooth 16 colour-mode graphics!

Only £7.95 inc VAT & PP (Disc £10.95)

MISSILE ATTACK

(PURE MACHINE CODE, ARCADE QUALITY)
Another well known arcade favourite, 2 player/ Joystick options, remote target designation of incoming ballistic missiles & attack craft. Protect your cities! Incredible Armageddon graphics & sound!

£7.95

DOUBLE ACTS

2 GAMES, 1 THEME,

Amazing value at only £6.95 per pair:

SPOOK, SPOOK:

MUNCHER 2 ghosts, 20 mazes, 3 skill levels, hall of fame GHOST MINE Dig for gold, watch for spooks & snakes.

SPACE, SPACE:

WOLFPACK 3 starships, 1 space station, 4 galaxies, unlimited motion in space! MISSION ALPHA 3D High speed action, hall of fame & music!

SPY, SPY:

KREMLIN Escape through the endless 3D corridors of the Kremlin, aided by map & compass, but watch for the Gremlins!

BONDSKI Lethal action as James skies down the slope & parachutes into the void!

WORD PROCESSOR:

WORD PERFECT £8.95 cassette £11.95 Disc
Full facility 40/80 column word processor, wrap around, block move, justification, word replace, etc. With full instructions & Key insert.

ONE DISK HOME OFFICE:

Complete Menu driven home office system including WORD PERFECT, WORDKIT, LETTER, CALCULATE (mini spread-sheet), & DIRECTORY (expandable card file system). Supplied with detailed manual. We believe this to be the best value package of its kind ever offered.

Only £15.95 Disc only.

EDUCATIONAL SOFTWARE:

TALKING TABLES TEACHER (7-14yr old) Speaks when Speech ROM fitted, teaches multiplication with colourful games & questions. £6.95

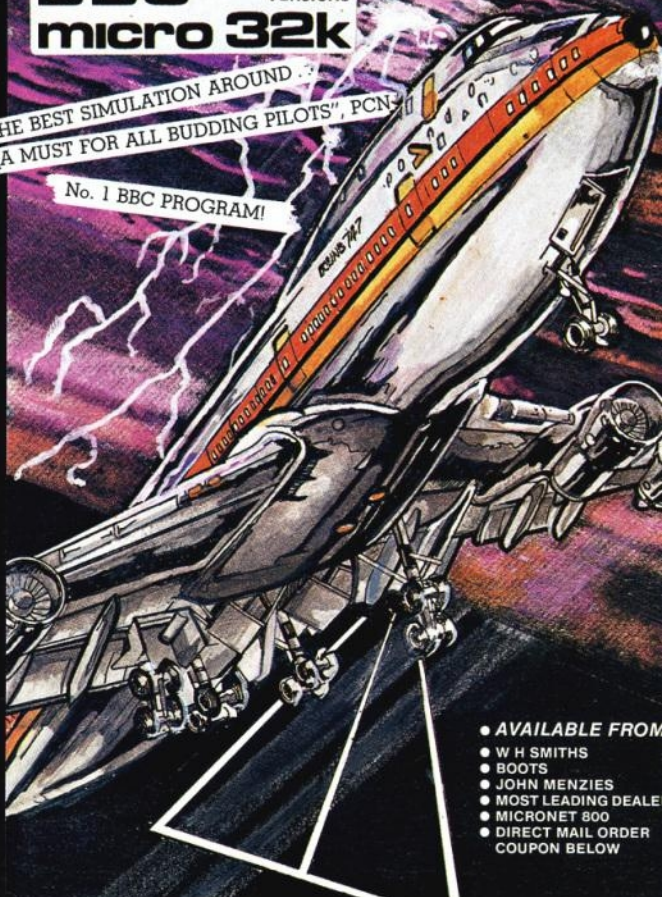
COLOUR SHAPE MATCH (2-6yr old) Beautiful suit of 3 programs teaching shape & colour recognition with delightful graphics & sound. £6.95

747

BBC KEY & JOYSTICK
VERSIONS
micro 32k

"THE BEST SIMULATION AROUND"
"A MUST FOR ALL BUDDING PILOTS", PCN

No. 1 BBC PROGRAM!



- AVAILABLE FROM
- W H SMITHS
- BOOTS
- JOHN MENZIES
- MOST LEADING DEALERS
- MICRONET 800
- DIRECT MAIL ORDER
- COUPON BELOW

DEALERS CONTACT (0903) 206 076



MAIL ORDER



ALL PRICES INCLUDE VAT, POSTAGE + PACKING FREE

TITLES

QUANTITY

DISK ☐ CASSETTE ☐

I ENCLOSE CHEQUE, P.O., ACCESS NO., VALUE

NAME

ADDRESS

WE WELCOME HIGH QUALITY
PROGRAM SUBMISSIONS AND
PAY TOP ROYALTY RATES

In the dim, dark, dreaded days of Recessionsville, successful games programming has become one of those legendary occupations — like rock 'n' roll or football — by which the young and stony can transmogrify themselves into the still-young and disgustingly wealthy. But is this vibrant myth true? Are there still openings for teenage computer geniuses? And how much do they really earn?

PAUL WALTON ran five of the biggest star-names to earth in an attempt to find out.



DO YOU SINCERELY WANT TO BE RICH?



VideoKids are today's microcomputerraneans. Too young — or too poor — to have been hobbyists in the mid-'seventies, these VideoKids grew up on the affordable WH Smith's-style micros.

It began with the ZX80 (kit form for the real cognoscenti); the lumbering Pet; the TRS 80, Colour Genie or an early BBC.

And this cult has its heros... BIG K went in search of some of the faces behind the names of the ace games cassettes. As a Virgin Games star quipped wryly, "Gone are the days when a kid added years onto his age — it's now fashionable to take off a couple."

Arbiters of the public taste and whim, be they media or games-biz software house, have been in quest of the pre-school machine code programmer, of the child genius hooked on *Pac-Man*, of the teenage high-tech millionaire.

SEVENTEEN-YEAR-OLD MATTHEW SMITH has just quit Liverpool's BugByte to found his own independent label with a couple of other known-names — as Software Projects. A relatively new VideoStar, it was Smith who brought the US videogame *Miner '49er* to the Spectrum *et al* with his related, *Manic Miner* just over a year ago.

He's now haggling with BugByte for payment of substantial royalties (around £16,000) on the 40,000 copies of *Manic Miner* they still hold in stock. Matthew's already made that much again from his 5 per cent cut on the first 40,000 copies.

"It's a popular misconception that I worked for BugByte and was then lured away. I never did — all they ever did was to manufacture and sell my game for me," said a now older and wiser Matthew Smith. He left BugByte together with one of the founders, Alan Maton. He took *Manic Miner* with him "as a way of getting Software Projects off the ground."

Matthew began playing games on a cheapo-cheapo Tandy TRS 80 model 1. While still 16 he produced his first game, called *Styx*, but added that it was "quite a flop" for BugByte. "But that didn't put me off. I just got down to writing *Manic Miner* that summer (1982). I realise that *Styx* was so bad because I had been writing it on the Spectrum, rather than using the TRS 80 for design and then targetting back to the Spectrum."

"It's become a lot easier to write the game which I'm now working on, *Jet Set Willy*. Since I fixed a hardware fault on the TRS 80 model 4 which I now use," he added. *Jet Set Willy* is a classic shoot 'em' up speed-freak's game.

And what of fame and fortune? Well, Matthew is well known in the designer world but hasn't yet got the VideoStar status he deserves. But will admit to "tens of thousands of pounds" in royalties for eighteen months' work.

This is "the reward of being able to stay freelance", said Matthew, and he added that to save the hassle of starting a company and still get more than a couple of per cent, even he might do things differently.

"If I were starting again and had a good game, I'd offer it around several software houses before accepting the first offer that comes along," said a slightly bitter Matthew. For every pound which he gets from *Manic Miner*, BugByte rake in the other £19... that's £76,000 worth of sales.

And the moral of this story? "Stay freelance, very definitely!"

A FLOWER SOON TO FADE?



And then there is seventeen-year-old EUGENE EVANS, the VideoStar that everybody's heard of — in fact Imagine's ace designer is getting a bit sick of the publicity. "I try to ignore the cynical comments, like 'why should you be earning so much at your age', and all the sarcasm that seems to appear in the press."

Imagine, easily the country's biggest games house, have stopped putting the designer's name on their ads or on their cassettes. Now home of what might be termed the New Merseybeat, "it's like an ongoing soap opera" to Eugene. "Everybody moving from one company to the next as easily as pop stars move record labels."

By virtue of the fact that he was the tea-boy at one of the first Liverpool "microcomputeranea" firms, MicroDigital (to high-tech and VideoStars what the Cavern was to the Merseybeat and the Beatles), "I learned to use every machine going — I just sat down and used them all."

Eugene is now at what you might call "the serious end" of the games business: "Imagine is going to be around a lot longer than I am, after I've gone off writing games and moved on to something else." The dawn of a new era, rather than a new fad, can be found with businesses like Imagine, with loose associations, or independent outlets (or "indies") like Software Projects, or with production studios like adventure aces Apocalypse Software of Oxford.

"Each of the 100-plus people at Imagine is a specialist in some part of computer games design," said Eugene. "For instance, we've just put out *Alchemist* on the Spectrum with music produced by our own in-house band."

"The point is that we don't think that you can expect to do everything yourself! And that applies to the artwork, the ideas and the animation."

And what about the £40,000 plus which Eugene Evans took home in 1983? "I'm only getting what I'm producing. I couldn't get that anywhere else. More and more games designers will be getting a share of the whole thing, not the lump sum royalty. It'll become more like A Job."

A Job — Good Grief!

And who will the employers be, in Eugene's vision of the future? Big business, like Virgin Games or Imagine Inc.? Not necessarily. There are ways of working together and still staying independent, but perhaps the archetypal VideoStar might fade after a brief shot at the bigtime.

THERE'S MONEY IN MUTANTS

Twenty-two year old JEFF MINTER, the man behind the *Llama(Soft)* and the *Mutant Camel* doesn't mind the long hours poring over a keyboard — in fact he's just had his own "computalab" built over the garage to house all the hardware which financial success has brought.

Jeff could well claim to be the county's VideoStar. Not one of his impressive half dozen games has ever missed. People buy from the *Llamasoft* company which he runs (with his mum) "in the same way that some people just buy Pink Floyd albums, whatever they're like," he said.

Jeff is a unique designer in lots of ways. After a brush with the school's Pet (201 — for those who can remember it), he's concentrated on producing games on the target machine for which they were intended (ZX80/81, VIC or 64 usually), and he doesn't use a larger machine to cross-compile games back down across a whole range. It is common knowledge that some firms now even use mainframe computers to design micro games.

Minter won't have any of this: "I take it slowly, using the qualities of the target machine to the best advantage to keep up the quality of the game," with the only exception being the use of the superior VIC screen editor to write Commodore 64 games.

The result has been a stream of hits, starting with *Loadrunner*; its sequel *Gridrunner*; *Matrix*; a new idea in *Hovver Bovver*; and the deservedly renowned *Attack of (and the Revenge of) those Mutant Camels*. Having *Llamasoft* — which contracts out copying and distributing the cassettes — means that Jeff Minter and his mum get to keep most of the loot.

Is he a rich man? "Well I'm not telling you how rich — but I'm very comfortably off!" said Jeff. "My last game, *Revenge*, has just topped the 10,000 sales mark, so work it out."

Just like Matthew Smith, Jeff Minter reckons that there's a lot gained by being a VideoStar "and I'm no different a person today, despite all that money". His advice to new designers is that, if you have to sign-up, "Get them to promote you — don't stay anonymous. People will follow you, the games you write, not the games house."

THE LONELINESS OF THE LONG-DISTANCE PROGRAMMER

Twenty-four-year-old STEVELEE didn't have the time to hold-out for a bigger slice of the cake. After eventually turning in his first games hit at the ripe-old age of 22, the then computer operator found himself on the dole.

"Last spring I found out that I wasn't going to become a programmer [of larger minicomputers], when I was made redundant from a bank. I didn't have the time to wait for my games royalties to come in, so after seeing their ads I went along to Virgin Games," said Steve.

Steve is now Virgin's "major unit earner", as they call him, or a VideoStar, grossing more with the Commodore 64 wham-bam game *Falcon Patrol* "than all the rest of the list put together", he proudly adds. "Yes, very pleasing that one."

But it wasn't easy. His first game, *Mission Mercury* was a flop — because it came out for the unexpanded (memorywise) VIC-20 just weeks before Commodore cut the price of memory expansion.

And he almost didn't make it this far. "If I hadn't have signed for Virgin, I wouldn't still be writing games today. I'd be trying to be a 'real' computer programmer," he said with more than a hint of irony.

Steve is one of the original ZX81-for-Xmas crew (in 1981 to be precise), but he soon moved up to the newly-released VIC-20. Being a programmer by training, Steve soon knocked out his first game on the VIC — "it was called *Tornado*, a copy of *Scramble* really".

And then? "... But I didn't do anything with it for the first six or seven months. Since I didn't play a lot of games myself I sort of assumed that the commercial stuff was better. Which on the whole it wasn't!"

Steve Lee took *Tornado* to London-based Quicksilver last January. It sold well enough "to pay expenses," he said. Nothing special. But the follow-up, *Sky Hawk* (also on VIC) "really took off". But even his (fair) royalty on gross sales of 12,000 — 14,000, and an up-front advance, weren't enough to see Steve through 1983.

He, and several other VideoStars, went to Virgin Games on pretty rigid exclusive contracts because, as Steve comments "they were the only ones at that time who could offer you a reasonable living guaranteed".

Nobody will discuss Virgin's deal, except to say that it's "like a weekly wage with a small royalty twice a year — like Christmas and birthday presents".

But, to be fair, Steve reckons that Virgins are "as good as any other firm to deal with the business end" — copying tapes, selling them



through shops or mail order — "and probably better when it comes to working out ideas".

Steve Lee will stay with Virgin — "although I don't think I'm going to get rich, become a millionaire, say, not here." He is now working on a new game, *Hideous Bill and the Gigans*, which is a refreshing departure for him, being "more adventure than shoot 'em up". And there will be a sequel to *Falcon Patrol*, taking the original idea a bit further and "adding in some of the ideas which got cut last time around".

As we left him, Steve was rather reluctantly returning to his C64 keyboard. The isolation of the job does depress him: "All in a fourteen-hour-day's work!"

Twenty-two year old DAVID AGULNIK, chief of Apocalypse Software, was anxious to point out that he "doesn't program — I'm lousy at it!" And yet he is a VideoStar of sorts... a computer games producer/director, doing what Malcom MacLaren did for Punk.

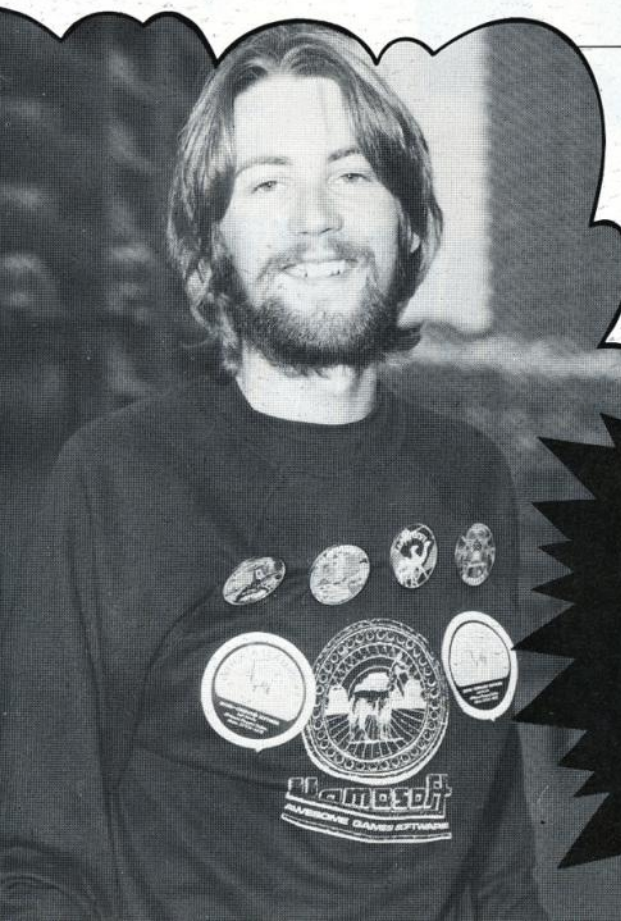
"This won't be a star-orientated business in the future — it will be more like the film or record industry, with groups of specialists working together in groups. A game will be directed, not written by one person," Dave told us. Apocalypse is about to release a couple of games for the top five or six machines — *Dreadnought Disaster* and the *Mystery of Arkham Manor*, both written in a patent Adventure Language (ALANG).

YOU WON'T GET RICH WRITING GAMES FOR BIG K . . .

But by Crackey it'll be good for your credibility. Yes, folks, what we here at BIG K want from YOU is progs. Lots and lots of progs. For any micro. If it runs — we're interested. If we like it — we'll publish it. If we publish it — we'll pay you. So . . . if you'd rather be holding folding than doing what you're doing right now — get tapping.

Send your prog(s) on cassettes properly debugged, to:

BIG K (PROGS)
Room 206 IPC Magazines, King's
Reach Tower, Stamford Street,
London SE1 9LS.



```

PROGRAM: ROCKET
2 REM"[DEL6]
5 REM ROCKET COMMAND ADAPTED FOR VIC
  BY G. HOAREWELL
10 VI=9*16^3:OF=38400-7680
  :PRINT"[CLEAR]"
15 FOR A=38400+22 TO 38400+22*23
  :POKE A,0:NEXT
15 C=7680+22*20+15
20 POKE VI+15,6+128+64+32+8
21 GOTO 30
25 AA=0:IF PEEK(37151)=30 OR PEEK(371
51)=26 THEN AA=1
26 RETURN
30 PRINT"[HOME,RED]*** ROCKET COMMAND
  ***";
31 PRINT"[WHITE]GUIDE MISSILE WITH
  JOYSTICK. BUTTON FIRES"
40 PRINT"[HOME,DOWN15,BLACK],[LEFT,
DOWN],[LEFT,DOWN],[LEFT,DOWN],[LEFT,DOWN]
[LEFT,DOWN],[LEFT,DOWN],[LEFT,DOWN]
[LEFT,DOWN]";
50 PRINT"[UP,LEFT15]~~~~~"
60 A=7680+22*22+15
70 GOSUB 25:IF (AA<>0)AND(B=0)THEN B=1
  :POKE C+22,32:D=C:C=C-1:K=1
  :POKE 9*16^3+13,128+125:L=16
71 IF K=1 THEN L=L-1:POKE 9*16^3+14,L
72 IF L=0 THEN K=0:POKE 9*16^3+13,0
75 IF C=8121 THEN PRINT"[HOME,DOWN7]
  NO MORE ROCKETS!!!"
  :POKE 9*16^3+14,0:FOR AA=1 TO 3000
  :NEXT:RUN
80 IF B=0 THEN 110
85 POKE D,32:D=D-22
86 POKE 37154,127:PJ=PEEK(37151)
  :IF PJ=110 OR PJ=46 THEN D=D-1
87 IF PEEK(37152)=119 THEN D=D+1
88 POKE 37154,255
90 IF PEEK(D)=60 OR PEEK(D)=62 THEN G
  OSUB 500:GOTO 70
100 IF D<7680+88 THEN B=0:GOTO 110
105 POKE D,30
110 IF H=0 THEN 200
115 IF H=0 THEN 70
120 POKE F,32:F=F+E
125 IF F=I THEN H=0:GOTO 70
130 IF PEEK(F)=30 THEN GOSUB 500
  :GOTO 70
140 POKE F,G:GOTO 70
200 H=1
205 IF INT(RND(1)*2)=1 THEN E=-1
  :F=7702+(INT(RND(1)*10)+6)*22
  :I=F-22:G=60:GOTO 115
210 E=1:F=7680+(INT(RND(1)*10)+6)*22
  :G=62:I=F+22:GOTO 115
500 B=0:H=0
501 SC=SC+10:PRINT"[HOME,DOWN3,BLACK]
  SCORE = "SC
502 POKE F+OF,4:POKE F+1+OF,4
  :POKE F-1+OF,4
503 POKE F+OF+22,4:POKE F+OF-22,4
510 POKE F,160:POKE F+1,160
  :POKE F-1,160:POKE F+22,160
  :POKE F-22,160
521 POKE 9*16^3+13,128+35
522 FOR Y=16 TO 0 STEP-1
523 POKE 9*16^3+14,Y
524 FOR P=1 TO 80:NEXT:NEXT
530 POKE F,32:POKE F+1,32:POKE F-1,32
  :POKE F+22,32:POKE F-22,32
533 POKE 9*16^3+13,0
540 FOR GH=F TO F+22*16 STEP 22
544 II=PEEK(GH):POKE GH,G
  :FOR OO=1 TO 60:NEXT
546 POKE GH,II:NEXT
800 RETURN

```



by G. Hoarewell
for VIC 202

ROCKET!

"This is NASA. At this time we have an ongoing lift-off situation. Wait! Oh my Gahd! We've just heard that the inbuilt flight computer has gone on the blink! This means that Major Al Hoolahan — that's his name, right, Barbara? — has gotta fly that bird all on his ownsome or head pronto for the Big Splashdown in the Sky. This is ABC news, folks, the channel that brings you the disasters as they actually happen. And now a word from our sponsor..."

You're on your own, Al.



SP = Spectrum, AC = Acorn, 64 = Commodore 64,

key

V20 = Vic 20, 81 = ZX 81, DR = Dragon 32, OR = Oric-1

TOP 30 GAMES

(Retail)

			SP	AC	64	V20	81	DR	OR	Price
1	(1)	ATIC ATAC	Ultimate	*						£5.50
2	(2)	LUNAR JETMAN	Ultimate	*						£5.50
3	(5)	PYRAMID	Fantasy	*						£5.50
4	(6)	ANT ATTACK	Quicksilva							£6.95
5	(17)	SNOOKER	Visions	*	*	*	*			£8.95
6	(3)	VALHALLA	Legend	*						£14.95
7	(12)	KONG	Ocean	*						£5.90
8	(4)	CHEQUERED FLAG	Psion	*						£6.95
9	(7)	SPLAT!	Incentive	*						£5.50
10	(10)	THE HOBBIT	Melbourne	*	*	*		*		£14.95
11	(21)	MANIC MINER	Bugbyte	*						£5.95
12	(30)	DEATH CHASE	Micromega	*						£6.95
13	(14)	MR WIMPY	Ocean	*						£6.90
14	(—)	THE ALCHEMIST	Imagine	*						£5.50
15	(—)	HUNCHBACK	Ocean	*	*					£6.90
16	(8)	FLIGHT SIMULATION	Psion	*						£7.95
17	(—)	POOL	CDS	*						£6.95
18	(13)	ARCADIA	Imagine	*	*	*				£5.50
19	(24)	PENETRATOR	Melbourne	*						£6.95
20	(11)	HUNTER KILLER	Protek	*						£7.05
21	(—)	JET PAK	Ultimate	*		*				£5.50
22	(15)	FALCON PATROL	Virgin		*					£7.00
23	(9)	METAGALACTIC LLAMAS	Llamasoft			*				£6.00
24	(—)	3D TIME TREK	Anirog		*	*				£7.00
25	(18)	MOONBUGGY	Anirog		*					£7.00
26	(—)	CRAZY KONG	Interceptor		*	*				£7.00
27	(16)	HORACE AND THE SPIDERS	Psion/Melbourne	*						£6.95
28	(—)	INTERNATIONAL FOOTBALL	Commodore		*					£9.99
29	(8)	HOVVER BOVVER	Llamasoft		*					£7.50
30	(—)	CHINA MINER	Interceptor		*					£7.00

Compiled by MRIB Computer.

VIDEO GAMES

(Dedicated Consoles)

1	POLE POSITION (Atari)
2	Q-BERT (Parker)
3	FATHOM (Imagic)
4	BATTLE ZONE (Atari)
5	GALAXIAN (Atari)
6	TUTANKHAM (Parker)
7	RIVER RAID (Activision)
8	DECATHLON (Activision)
9	JUNGLE HUNT (Atari)
10	SORCERER'S APPRENTICE (Atari)
11	ENDURO (Activision)
12	ROBOT TANK (Activision)
13	DIG DUG (Atari)
14	PHOENIX (Atari)
15	PLAGUE ATTACK (Activision)
16	PITFALL (Activision)
17	CENTIPEDE (Atari)
18	KANGAROO (Atari)
19	MOUSETRAP (CBS/Coleco)
21	WIZARD OF WOR (CBS/Coleco)
21	FROGGER (Parker)
22	PAC MAN (Atari)
23	DONKEY KONG (CBS/Coleco)
24	MS PAC MAN (Atari)
25	STAR WARS: JEDI ARENA (Parker)
26	VANGUARD (Atari)
27	SPACE INVADERS (Atari)
28	OINK (Activision)
29	SEA QUEST (Activision)
30	SOLAR STORM (Imagic)

Compiled by MRIB Computer.

also selling well
in mail order...

(Not based on sales figures and in alphabetical order)

ANT ATTACK
(Quicksilva)
ATIC ATAC (Ultimate)
ATTACK OF THE
MUTANT CAMELS
(Llamasoft)
AIRSTRIKE II (English
Software)
BUGABOO (Quicksilva)
CONFRONTATION
(Lothlorien)

FOOTBALL MANAGER
(Addictive)
GRAND MASTER
(Audiogenic)
JOHNNY REB
(Lothlorien)
LOST IN SPACE
(Salamander)
LUNAR JETMAN
(Ultimate)
MICROBOT (Softtek)
MOTOR MANIA
(Audiogenic)
1984 (Incentive)
PILOT 64 (Abbex)
POOL (CDS)

REVENGE OF THE
MUTANT CAMELS
(Llamasoft)
737 FLIGHT
SIMULATOR
(Salamander)
SNAPPER (Acornsoft)
SNOOKER (Visions)
SPACE SHUTTLE
(Microdeal)
SPLAT! (Incentive)
UGH! (Softtek)

SPOT THE DIFFERENCE!

Choosing which game to buy from the mountain available is a difficult job, especially when everyone claims to produce the best on the market. But how can you tell the best from the rest? To help you decide, read on. . . .



THE DUNGEON MASTER

Let your Spectrum be your guide in a totally new dimension in adventures in the true spirit of traditional role playing games where YOU design the scenario.

"I have been a Dungeons and Dragons fan for several years...The package provides excellent entertainment for all fans of the cults and should prove a good introduction to the game".

.....Sinclair User.
"Highly recommended for its versatility, originality and quality. Definitely well worth obtaining".

.....ZX Computing.
ZX Spectrum 48K £7.50

Written by Graham Stafford.

What the real critics say. . .

Very rarely have software titles produced such universal acclaim as 'Halls of the Things' and 'The Dungeon Master'. Now, with three brand new programs, Crystal continues to set the standard of software excellence. The difference is obvious - the choice is yours:

The Best or The Rest.



HALLS OF THE THINGS

A stunning multi-level maze 'arcade' adventure'.
"Excellent and dangerously addictive - could change the Spectrum games scene overnight".
.....Sinclair User.

"Spectacular - One of the best games I've seen, finely balanced between simplicity and addictiveness - superb graphics and colour - I CAN'T RECOMMEND IT HIGHLY ENOUGH".
.....Popular Computing Weekly.

ZX Spectrum 48K £7.50
Written by Neil Mottershead, Simon Brattel and Martin Horsley.



INVASION OF THE BODY SNATCHERS!

At last! a version as fast and furious and as frustratingly addictive as the arcade original. Landers, Mutants, Bombers, Pods, Swarms and much much more combine to produce the ultimate space game!

ZX Spectrum 48K £6.50

Written by Simon Brattel and Neil Mottershead.



THE ISLAND

The ultimate test of logic and deduction! Can you solve the hidden mysteries of the South Pacific Island on which you have been stranded - and escape alive! A brilliant classic style adventure game to fascinate and frustrate you for months!

ZX Spectrum 48K £7.50

Written by Martin H. Smith.



ROMMEL'S REVENGE

A brilliant interpretation of the most visually stunning arcade game of all time. Superb high resolution 3D graphics with full perspective plus a host of new and exciting features make Rommel's Revenge the most spectacular game ever produced for your Spectrum!

ZX Spectrum 48K £6.50

Written by Martin Horsley.



Please Supply:

- Invasion of the Body Snatchers ☐
Rommel's Revenge ☐ The Island ☐
Halls of the Things ☐ The Dungeon Master ☐
Catalogue (please enclose SAE 6in. x 9in.) ☐

I enclose cheque/PO for.....

NAME.....

ADDRESS.....

DEALERS! For details of our excellent dealer discounts (including export) ring Chris Clarke on 061-205 6603.

PROGRAMMERS! Written any good software? send it to us for evaluation and details of our excellent royalty scheme.



Please send SAE for our latest catalogue and details of our forthcoming software.
Catalogue FREE with every order. P&P included.
Please add £0.50 per item for overseas orders.
Please make cheques/PO's payable to:
CRYSTAL COMPUTING
2 ASHTON WAY
EAST HERRINGTON
SUNDERLAND SR3 3RX

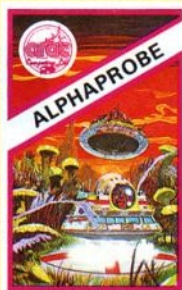
Tonight you could be 60,000 light years from home

Check out these nine
NEW thrillers from Artic!



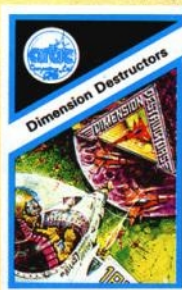
COSMIC DEBRIS

Asteroids, plummeting through the galaxy, miss your spaceship by millimetres! Clean up or get blasted! And look out for unidentified alien nasties coming at you from nowhere!
48K Spectrum £4.95
ORIC 1 48K £5.95



ALPHA-PROBE

Explore strange new planets, practice delicate landing manoeuvres. Collect desperately needed fuel or abandon your fateful mission.
16K ZX81 £3.95
16K/48K Spectrum £4.95



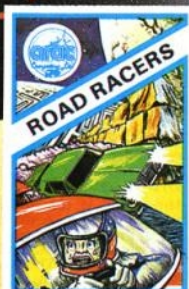
DIMENSION DESTROYERS

An armada of 3 dimensional Star Destroyers hurtle across your screen to destroy you. Swerve and fire to survive their attempts to blast you from the skies. Only the most skilled pilot will learn the terrible secret of this assault. The ultimate 3-D space war game.
Spectrum 48K ZX £5.95



MARTIANS

Wave upon wave of Martian attack ships threaten your survival. Only your inter-galactic marksmanship can save you. You must hit the nuclear power-packs at the heart of the Martian ships before they overrun the Universe.
VIC-20 £5.95



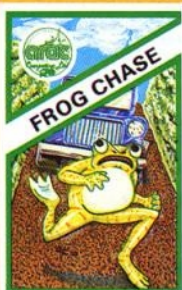
ROAD RACERS

You are speeding over an unknown race track, passing checkpoint flags to pick up valuable points. But watch out! There are other cars on the track and your fuel is running low!
16K/48K Spectrum £4.95



SNAKE

Among the flies and bugs your pet snake hungrily devours are a crop of poisonous mushrooms. Can you stop him eating them before it's too late? Mind he doesn't do himself in with his venomous bite!
16K/48K Spectrum £4.95
VIC-20 £5.95



FROG CHASE

FROG CHASE

Your pet frog has to make it safely across a road filled with speeding traffic. Then swim a river infested with vicious snapping turtles. Can you take him home without disaster?
VIC-20 £5.95 Joystick option.

MILLIMON

Millimon, the nasty grub, and his band of creepy friends are coming for you. Only your laser base can save you now!
16K/48K Spectrum £4.95



SCRAM 20

Your aim is to destroy the enemy base. Your high-speed ship has 100 gallons of fuel which can only be topped up by hitting enemy fuel dumps. Beware the deadly anti-intruder missiles. Watch out for the Zoids, Superzoids, Glamps and UFOs. Full machine code.
VIC-20 £5.95 Joystick option.

ARTIC COMPUTING LTD

Main Street, Brandesburton, Driffield YO25 8RL

Cheques and PO's payable to Artic Computing Ltd. Dealer enquiries welcome. Please state whether your order is for ZX81, Spectrum, VIC or ORIC. Access and Barclaycard welcome.

WARNING: These programs are sold according to ARTIC COMPUTING LTD's terms of trade and conditions of sale. Copies of which are available on request.

Send S.A.E. (9in. x 6in.) for FREE catalogue of our wide range of programs.



To: Artic Computing Ltd, Main Street
Brandesburton, Driffield YO25 8RL

Please supply

*Cheque for total amount enclosed £

Name

Address

* Access/Barclaycard No.

* Please delete or complete as applicable

AGF

PROGRAMMABLE JOYSTICK INTERFACE for Spectrum or ZX81

**MICRODRIVE
COMPATIBLE**

ONLY

26.95

+£1.00pp

AGF PROGRAMMABLE INTERFACE

Recognised as the only true Hardware Programmed joystick interface this product offers all the features associated with such a design.

You can use any Atari-compatible joystick controller with any software for your Sinclair Spectrum or ZX81, not just those with a joystick option.

Movement of the joystick is recognised by the computer exactly the same as pressing the appropriate control keys, and can therefore give the most immediate response to that movement. The hardware programmed design works with all possible key-reading methods, both BASIC and Machine Code.

Eight directional movement, with or without the fire button being pressed, can be achieved by only programming the left, right, up, down and fire keys required by the game.

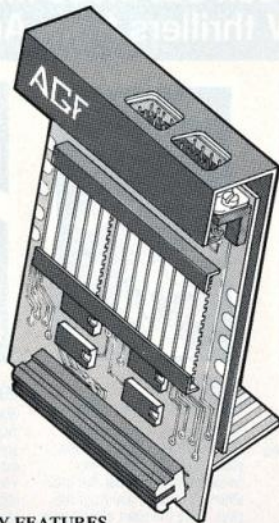
Programming is achieved by a two-digit code, which is looked up on the Programming Chart supplied, for each direction and firing button. These two numbers are then selected on a pair of leads which are clipped onto appropriately numbered strips on the interface.

Once configured this can be marked onto a Quick Reference Programming Card for storing with the game. As the programming is not power dependent the interface can be immediately used when next switched on.

The keyboard remains fully functional and can be used simultaneously with the joystick.

An integral rear expansion connector means there is no need to remove the interface to connect other peripherals.

NB. A recent design improvement now means that the AGF Programmable Interface works with the new Quickshot II rapid "Auto Fire" feature.



KEY FEATURES

- Programmable design gives TOTAL software support.
- Accepts Atari, Competition Pro, Wico, Starfighter, Quick Shot, Le Stick etc.
- Rear extension connector for all other add-ons.
- Free demo program and instructions.

PACKAGE CONTENTS SUPPLIED

- Programmable Interface Module as illustrated, complete with clip-on programming leads.
- Self adhesive programming chart detailing how to define which key is simulated by UP, DOWN, LEFT, RIGHT, and FIRE.



- One pack of ten Quick Reference Programming Cards for at-a-glance setting to your games requirements.



- 12 months guarantee and full written instructions.

ONLY
16.95
+£1 P&P



Quickshot II® JOYSTICK

NEW IMPROVED GRIP : BUILT-IN STABILIZING SUCTION CUPS

TRIGGER FIRE BUTTON : RAPID AUTO FIRE SWITCH : TOP FIRE BUTTON

FROM: MR/MRS/MISS

ADDRESS

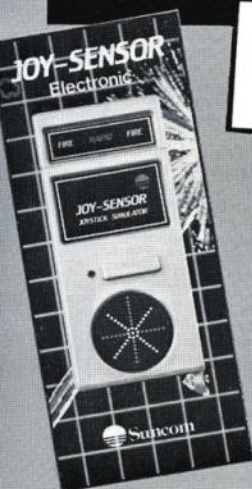
SEND C.W.O. (NO STAMP NEEDED) TO: A.G.F. HARDWARE, DEPT.BK.

FREEPOST, BOGNOR REGIS, WEST SUSSEX, PO22 9BR.

QTY	ITEM	ITEM PRICE	TOTAL
	PROGRAMMABLE INTERFACE	27.95	
	JOYSTICK(S)	17.95	
	PACK(S) QUICK REFERENCE CARDS	1.00	
ZX81 <input type="checkbox"/> ZX SPECTRUM <input type="checkbox"/> Please tick		FINAL TOTAL	
DEALER ENQUIRIES WELCOME		EXPORT PRICES ON APPLICATION	

WONDERFUL

**E
I
D
O
T
S
E
T
S**



Some call them Peripherals (though not with their mouths full). Necessary bits — or just so much junk? BIG K takes a wander down Bolt-On Boulevard and gives a few new products the once-over...

An end to Arcade Thumb and Video Wrist and other exotic computer-related ailments may at last be in sight — thanks to a new breed of hand controller. The Suncom Joy-Sensor (left), which retails at £29.95, offers a genuinely new way of avoiding fatigue while enjoying super-swift response to your input.

The lightest touch with the ball of the thumb on the tough circular pad beneath accurately signals movement info. Choice of FIRE or RAPID touchpads allows instant zapping in one mode and non-stop blasting in the other — ideal for games like Defender. The case is tough plastic airbrushed silver and looks likely to stand up to severe use — as likely as any conventional stick we've seen, anyway. The Suncom range is designed and made in the USA and not unnaturally favours Apple, Atari, Commodore and Coleco linkage. Assuming your style is very much shoot-'em-up, and you've got the best part of thirty notes to spare, you could make worse moves. Even better — there's no moving parts to

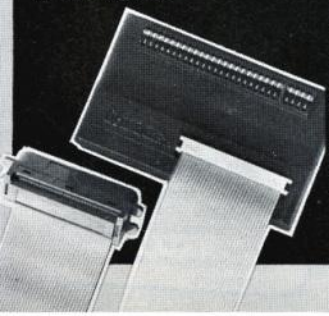
**FINGER
LICKIN'
GOOD**



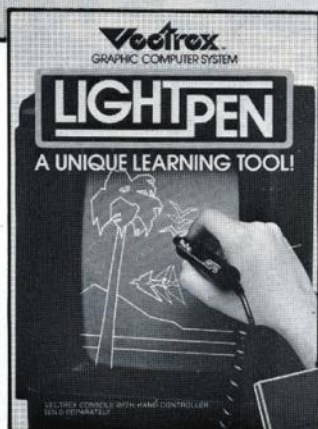
Communication Boost

One of the remaining beefs with the Sinclair Spectrum is the electrostatic ZX printer, the only model of printer which will talk to Spectra. Now all that has changed, thanks to those pioneering types at Kempston (home of the Spectrum Joystick). Their special Printer Interface (illustrated, left) allows you to hook up your Spec to most printers that will accept serial input — this includes Epsoms.

Plug in the gubbins, tap in a piece of supplied software (two lines of machine code), load or write your prog... and hey presto! It doesn't work. Well, ours didn't, and we've heard some similar tales from other sources. "Must be the code not getting into the buffer", said an Old Kempstonian when taxed with this one. Must be. The replacement software sent with commendable promptness also failed to activate the gizmo but to be strictly fair we're beginning to hear about ones that work as advertised. No doubt it'll all come right before long. At more than fifty quid it should, shouldn't it? And the benefits (banish that shiny-paper look) are incalculable.



wear out (we think), so if megalongevity (good word?) is your aim, again, you could do worse. There's a final classy touch: a single slider switch amidships converts the FIRE/RAPID touchpad to left-handers' and right-handers' preference.



VECTOR VICTOR

Light pens are a source of hair-raising wonder even to those who've seen them before. Vectrex's model, for use with their unique vector-graphics videogame system, provides a good intro to the world of on-line screen graphics. Using the pen, which plugs into a controller port, and the supplied *Art Master* ROM cart, Vectrex owners can choose from a menu of three options to sketch, connect (plotted dots), or animate up to nine separate frame sketches.

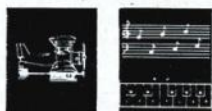
The pen itself is small, neat and fault-free; everything works as it should. The only drawback is the inability to

save your finished work in any shape or form.

Vectrex say they're working on it.

In the meantime if you already own another computer this product won't help; but if you've got hold of a Vectrex, then the Light Pen provides a useful bolt-on — especially as Vectrex have now announced plans to upgrade the system to full computer status with a bone-fide keyboard plus a barrelful of RAM.

From game system to stand-alone vector graphics machine, the odd-man-out Vectrex suddenly looks to have a lot more credibility than some had thought. Especially as it has its own screen.



WIDGETS

WONDERFUL



SUPERCHARGERTM SYSTEM

ENTER THE 2700

by Steve Keaton

THE HUMBLE Atari VCS. You can find them in thousands of homes across the country. Some remain avidly used but many now sit neglected, having become little more than an affectionately-remembered relic from gameplaying days gone by.

However an astonishing new add-on has arrived that could well prove the salvation of the trusty 2600. It's called the Starpath Supercharger and it quite literally transforms your VCS into a state-of-the-art games machine.

The 'charger is in fact a large capacity storage device which plugs into the Atari like an overly plump ROM cartridge. Games stored on standard audio cassette can then be loaded directly into it in the usual micro manner via an attached cable jack. The system is simplicity itself but the results are astonishing.

The 'charger expands the onboard RAM of the VCS almost fifty fold, from 128 to 6272 bytes! This extra memory considerably extends its graphic capabilities. Price? £19.95, less than a standard cart.

Included with the Supercharger is a free game, **Phasor Patrol** — a sort of **Star Raiders** variant in which you scud through the galaxy routing out dastardly Dracons. All you need to get yourself spaceborne is a domestic cassette recorder (or personal hi-fi). Having found one simply insert the Supercharger into the cartridge slot of the VCS (insuring that the power is OFF of course) as you would a normal game and plug the attached cable jack into the EAR socket of your cassette player.

To show that it is ready to take a game the Atari will then cause the message 'REWIND TAPE—PRESS PLAY' to flash upon the screen. Now just bung the game cassette into the player and hit the required button. Those expecting the loading time of a Spectrum epic will be pleasantly surprised. The games load in under 30 seconds.

An impressive collection of Starpath Supercharger tapes is already available, and there's more waiting in the wings. The quality is almost comparable with the ColecoVision games system and many boast multi-load capability. This is a feature unique to the Supercharger which enables you to play not so much variations on a theme, eg. fast invaders, slow invaders, invisible invaders, as a series of entirely different games. Complete stage one and the VCS will ask you to load in stage two. Each load adds new screens, characters and levels of difficulty. Scores from successive games are then incremented to provide one final overall total. It's a neat idea. The games retail for £9.95.

BEST OF THE

STARPATH CORPORATION

GAMES

RABBIT TRANSIT

Mammoth quotas of cuteness mark this multi-screen romp through *Watership Down* land. In it you assume the mantle of guardian angel to a small white rabbit — the idea being to help it negotiate meadows and ledges in a quest for the fabled Bunny Bushes of yore.

Screen one finds you in the Mysterious Meadow. Here you must hop your furry pal down to the river bank and onto a friendly turtle's back. As you might imagine though a variety of nasties, including butterflies, bees and chattering teeth will all try and stop you. Needless to say traversing the meadow becomes increasingly difficult.

Having made the relative safety of the turtle you'll be whisked away to the Land of Ledges. Now you must leap from ledge to ledge thereby converting their colour. However as you bounce happily about a nutcase at the top of the screen is busy throwing rocks in your direction. In later screens these rocks not only pose a health hazard, but recolour the ledges you've just painted! You'll have to retrace your steps and convert the rotten things again.

The game is a delight to play. The audio visuals are terrific and the challenge level surprisingly high. Just take one visit to the Bunny Bushes and I guarantee you'll be hooked.

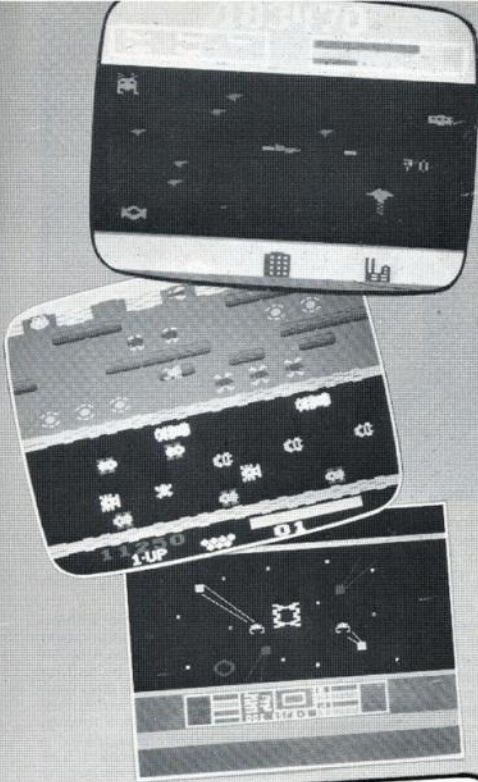
SURVIVAL ISLAND

You begin this multi-load graphic adventure shipwrecked somewhere on the high seas, with nothing more than a raft to your name. You've little choice but to begin an arduous journey towards the volcanic island which lies smoking on the horizon.

However any thoughts of a peaceful paddle are rudely interrupted. Sharks and Sea Monsters provide unwelcome company, shoals of fish help themselves to any supplies you may find and an unfriendly submarine surfaces at the worst possible times.

Should you ever make it to the island (it took me umpteen tries) you'll be asked to load phase two. This deposits you upon the shore where you'll work your way towards a secret temple. Unfortunately my life points at this stage were so severely drained that I could barely get to my feet let alone explore. Consequently I saw little of the island and nothing of Load three.

Devotees of David Crane's *Pitfall* will doubtless be hugely excited by this offering. The area of play is massive and attention to detail impressive. The explorer himself is a dead ringer for David Bellamy. It's a game with all the ingredients of a longterm obsession.



FROGGER

Perhaps a curious choice for a 'best of' collection, owing to its great age, but I had to include it because it's simply the best version that I've seen outside of an arcade. The graphics are marvelously detailed. Trundling steamrollers scroll alongside formula one racers, whose little wheels spin ten to the dozen, while turtles, complete with fins, paddle happily in the river. All the features that made the original such a hit have been faithfully reproduced. It's a conversion that makes the rival VCS offering from Parker look decidedly mundane.

Gameplay is fast and colourful. Progressive difficulty levels add crocodiles, snakes and otters to the on-screen hazards and sheets quickly become perilously congested. You'll need greased flippers if you aim to collect any pension!

It's standard fare of course, but I doubt if you'll see it better done.

PARTY MIX

This is a scream! No less than FIVE totally barmy party games for between two or four players (no solo options), all of which are beautifully rendered and unbelievably noisy. However this is included for just one load, *Tug Of War* — never have I laughed so much at a video game!

The idea is simple: one paddle controller pulls the red team and the other the blue. To

KILLER SATELLITES

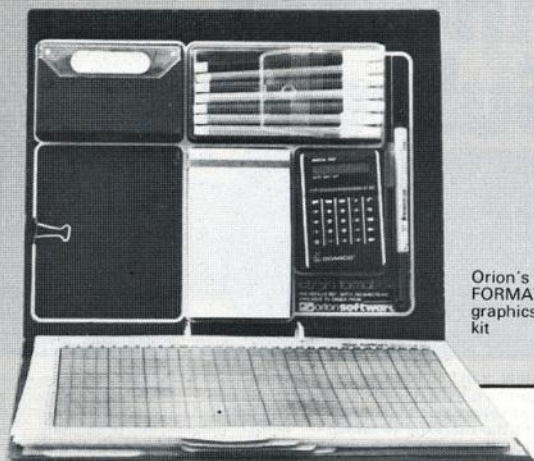
Without question the most challenging cartridge for the unexpanded VCS is *Defender*. The thing plays uncannily like its arcade parent and is guaranteed to shrivel the nerves with its fearsome speed. Since its release the cart has stood untouched in the 2600 library. That is — until now. Starpath's *Killer Satellites* not only mimics *Defender's* play but surpasses its graphics with a dazzling visual flair.

The scenario has been given a different twist but the results are pretty much the same. As the test pilot of Earth's only rocketship you must scour the countryside for the first sign of an alien invasion.

The aliens themselves are superbly designed, being all manner of shapes and colours. The game lacks the mutant takeover routine but compensates with a meteor storm that's awfully tricky to outmanoeuvre.

make your guys tug you have to hit your fire button. The faster you hit the harder they pull. Can you imagine the scene as the starter fires? Two supposedly adult individuals frantically pounding their buttons in order to make their teams move? Good grief — it's ridiculous! And if you're evenly matched the battle can go on for ages.

On my first attempt at it I collapsed in hysterics and had to be carted away.



Orion's
FORMAT 4
graphics
kit

Map that game! At last you can plan your graphics properly — no "busting" from one supposedly mapped area into another, no incomprehensible sprites or tacky animation. With Orion Software's **FORMAT 4** Spectrum graphics kit you can do all this and more. The kit? A ringbinder with matrix sheets, hex charts, overlay films etc., plus coloured pens, a blank C15 AND a calculator. All for £16.95.

... BUT IF YOU LIKE VIDEO WRIST ...



Left: the Suncom TAC-2 — a real gourmet stick. Right: the companion Slik-Stik employs minimum movement.



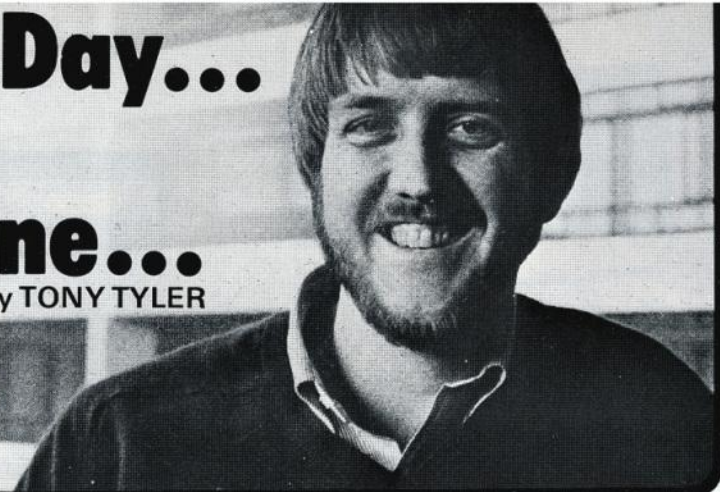
Aerobics, girls? This little number attaches to the bars of your Anti-flab bicycle.

Despite the trackballs, joy-sensors and other exotic controllers, most of us are still left with joysticks to fulfil our alienocidal fantasies. Here is an area where progress has been rapid. Many companies now market "gourmet" sticks for discerning alienocides. These are from Suncom (like the Joy-Sensor on the previous page) and fit Atari-/Coleco/Commodore ports. The Tac-2 is the most expensive at £18.95, but you can slum it with a Slik-Stik for half the price, or even gerron yer bike and do a Tebbit with the Aerobics Stick.

Another Day... Another Subroutine...

by TONY TYLER

DAVID CRANE, Chief Designer at US ROM-specialists Activision — and famous as the writer of *Pitfall* and now *Decathlon* — takes a dim view of anything upmarket of a 2600 VCS Atari. "Revolution?" he says. "What revolution?"



WHEN YOU formed Activision, to what extent did you find yourselves prisoners creatively of the machine to which you pitched your earlier games — the Atari 2600 VCS which, although the definitive dedicated videogame machine, is by any consent limited technically and architecturally?

The limitations have always been the fun part. The 2600 has limitations as do all machines. But this hardware, which has a very simple architecture, requires the most of its software! Differences between games were and are almost entirely a function of the software — which was and is removable. Therefore at the time you mention this was the most versatile machine of all. It still can play the widest range of games. I can't say that we've only just scratched the surface, even now, but there's lots of things that I can do right now that I've not done before and I'm sure that there's just as many that I won't think of until I think of them!

Do you think that the first game-machine and computer designers made a mistake in opting so heavily for the expensive ROM-cart format rather than cassette? Considering that it's widely held that the commitment to the ROM-cart games machine has been said to have held back the personal computer revolution in the USA?

There's certainly been an over-production of ROM cartridges. The problem was the high profit margin, drawing lots of companies in — we knew at the time they didn't have the qualifications. What we didn't foresee was that every time an operation goes out of business it sells off its inventory! That's where the US ROM-cartridge glut has come from. As for the idea that the installed video-game base was holding back the computer revolution — well, I kind of chuckle. First of all, no-one really has a use for a personal computer and no-one can think of one. And the manufacturers can't think of one to tell

ing out the window wondering what kind of game I'd like to play. 20 per cent of the time I might actually see an incident that gives me an idea. But if I'm designing a sports game, the rules — like for *Decathlon* — are already defined, and the problem is how to make the hardware achieve those effects in that sequence. I then sit down with a piece of paper and draw the screens that will do the job. And obviously I do the drawing knowing what the hardware itself can and can't do.

Once I get it down on paper I go right to the machine. What we have is a Digital Electric PDP-11, a relatively large minicomputer

and have it working perfectly before the end of the day before I go on to the next one.

So a subroutine roughly equals one day's work?

I don't like to go home with an unwritten program hanging over my head. That's me. Now Al Miller [Activision colleague], he'll sit in a rocking chair for three days writing the program — he writes most of it at that time. Comes in to work, types it in, pages and pages, turns it on and sees what happens. I can understand that but it's not the way I work.

You think in assembly language?

Probably easier than English.

What gave you the idea for *Pitfall*?

I started *Decathlon* before *Pitfall*. I had the running man OK, but then I realised that at that time I would not be able to do a ten-event *Decathlon* justice. So I shelved it. Then I did *Pitfall*. I had to get the running man idea out of my system. OK, there he is, running across the screen. What next? He goes to another screen. What now? So I might as well put him on a path. Jungles have paths — better throw in a few trees — always bearing in mind that I'd want to be able to do this for other machines. Basically, if you can do it on the VCS, you can do at least a shadow of it on other systems.

So anyway, what use is a jungle path unless it leads somewhere? So I pencilled in a few objects. How about some places to fall? A few holes. He's got to land somewhere — I had to put in an underground level. Then I spent the next two months defining the game, saying where do I put the treasure, what kind of monsters lurk? Scorpions look pretty good. I thought I might have ghosts and skeletons in the tunnel — none of them looked good, so they didn't get in. We drew a lot of these beforehand on squared paper, colouring them in and so on. But it never looks the same on the screen as it does on paper — never.

Finally, I might spend six months on a program just doing things that you would hardly be able to tell weren't there before. It's that which people notice — even subliminally. Bug-free-ness. Freedom from bugs.

The last 10 per cent of the game takes ninety per cent of the time.

"A home computer is nothing more than a game machine with a keyboard..."

them! Right now a home computer is nothing more than a video-game machine with a keyboard.

And until someone does come up with a real use for a home computer, there is no revolution.

Could you describe for us the actual process that leads to the conception and design of a game such as *Pitfall* or *Decathlon*? From beginning to end.

Well, I might start by simply star-

which communicates with half a dozen different workstations — we timeshare. This gives me a place to keep my sourcefile. It allows me to edit the file and put it into assembly language.

Do you identify beforehand those screens or routines which are likely to give you the most trouble and go for them first? Or do you write sequentially, taking the problems as they come?

I start with the harder bits. It's difficult on a machine — that was never intended to display more than balls and paddles and maybe a couple of tanks shooting at each other — to make it handle, say, a running man. So the first thing I had was a couple of legs running across the screen with no body attached.

You pull that off very smoothly in both *Pitfall* and *Decathlon*. How many frames are there in the moving legs sequence?

You could say ten frames. You could also think of it as twenty frames!

And the shadow?

That was fun. To get the shadow to stay on the ground and not rise with the man when he jumps was one of the early problems. But in general you could say I program in small modules. I write a certain routine and make sure it works before I go on to anything else. I have an overall picture in my mind as to what I'm going to need. I always like to design one routine

THE
ACTIVISION
DECATHLON
By/Par David Crane

"It all began as a pair of running legs with nowhere to go..."

PHOENIX SOFTWARE

Available at Major Branches of Boots
& all Good Computer Stores...

COMPLETE THE ACTION..SOLVE THE ADVENTURE
IF WE'RE BIASED..THE EXPERTS AREN'T

Death Mines



TWIN CASSETTE PACK

DRAGON
'A splendid idea,.....
Phoenix must be
congratulated.....
Home Computing Weekly

'One of the best
versions I've seen....
Personal Computer News
..highly entertaining.
Soft

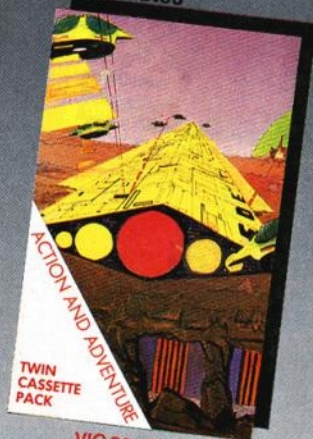


TWIN CASSETTE PACK

SPECTRUM 16/48K

'This is an absolute gem!.....
Master each skill level of action
and gather vital clues to the
adventure.....it has that
tantalizing mixture of predicta-
bility and randomness so beloved
of true adventure freaks.
100% value for money
Home Computing Weekly

Four Gates



TWIN CASSETTE PACK

VIC 20+16K

'Superb.....I've seen
nothing faster, noisier
or more addictive.
Popular Computing Weekly

'If you're after a good
game for that Vic you
got for Christmas then
then this is certainly
worth a look.....it's
great and very fast.
Value for Money 10/10
Computer & Video Games

New



CBM 64
The Sorcerer's Apprentice
Attack on Windscale



DRAGON
Mission Moonbase



VIC 20
O Level Caper



SPECTRUM
Dodge City

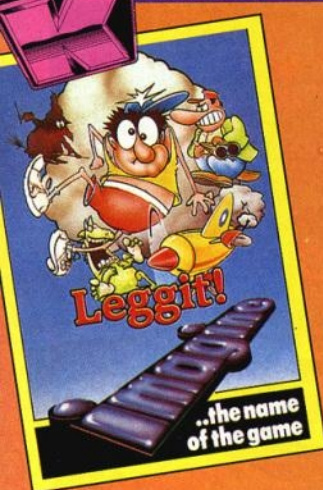
Coming Soon: Gulliver in Brobdingnag The Emperor Must Die



PHOENIX

: NOW THERE ISN'T A CHOICE! Pinner, Middx. 01-868-3353

Phoenix Software Spangles House,
116, Marsh Road,
Pinner, Middx. 01-868-3353



KEEP TAKING THE PILLS

Whoever dreamt this one up should be wreathed in manacles and incarcerated in some dank and horrid place. Like Belgium. Never has a game infuriated me so! I can take legions of alien craft, maniac miners, rampaging apes... even *Q*bert!* But this... Words fail me.

Leaping Lenny stands at the bottom of the screen. Above him rattle eight conveyor belts, each

one punctuated by gaps. For reasons best known to himself, Lenny wants to climb the screen and so you must leap him through the moving gaps. If you mistime your jump you'll brain yourself on the above conveyor and collapse unconscious in a heap. The gaps become more numerous the higher you get, so unless you move fast you'll plummet back to the level you've just leapt from. If you ask me the entire thing is just impossible. Apparently there are nasties to hinder your progress on subsequent sheets but I can't confirm this. I haven't made it that far.

I once got halfway up sheet one but brained myself at an inopportune moment and so toppled hopelessly back to the start. Believe me, the language to be heard wasn't sweet. This is one of those games in which the graphics are pretty incidental. There's little to be seen — although Lenny is nicely animated. The gameplay is the thing — and here it couldn't be tougher. Now if you don't mind I think I'll go check my blood pressure. — S.K.

Game: LEGGIT
Maker: IMAGINE
Machine: DRAGON 32
Format: cassette
Price: £5.50
Rating: KK



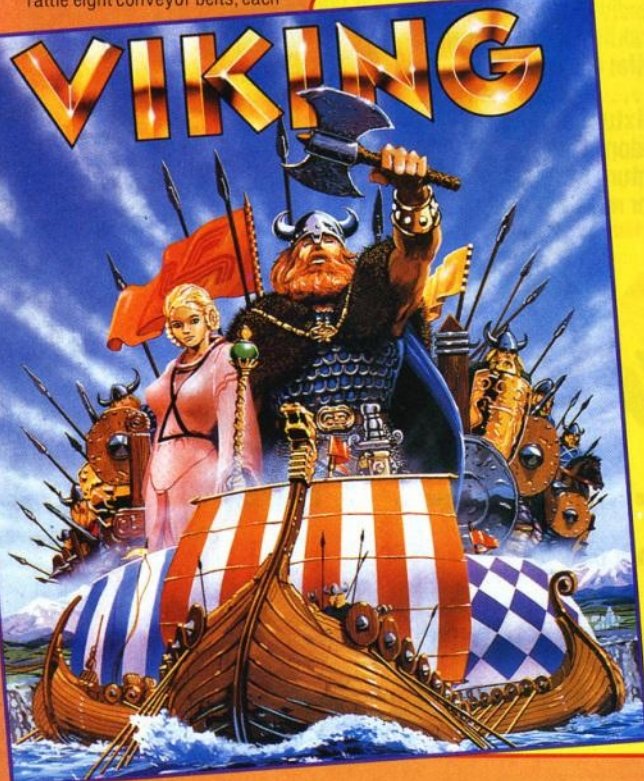
Reviewers:
Richard Burton
Paul Rambali
Tony Tyler
Steve Keaton
Andy Green
David Crossweller

Although claiming to be a graphical adventure, *Cimeeon Moon* is in reality a conventional 3D maze game. You are stranded onboard a deserted alien ship. The crew, who were once your enslavers, have mysteriously vanished and the door to your cell is unlocked. Can you discover a means of escape before they make their return? Do you even want to?

There are a number of items to be found, such as shield belts and Vacsuits which may prove of use, but you'll have to search hard for them as they're fairly well spaced out. The maze itself is nicely drawn but the game is infuriating. The commands you can use are limited and there are no responses given so don't expect any witty repartee. In fact the computer's vocabulary consists of little more than a rather childish 'Oopie!', which hardly inspires confidence.

I rapidly became cheesed off with the thing. Progress is slow if not impossible and rewards are thinly spread. *McKensie* (Software Projects), which runs on the Spectrum, is a real adventure with exactly the same scenario. Now I know which one I'd rather play... — S.K.

Game: CIMEEON MOON
Maker: DRAGON DATA
Machine: DRAGON 32
Format: cassette
Price: £7.95
Rating: None



Let's hear it for Norse Code

Have you ever fancied yourself as Hagar the horrible? If you have then this simulation of running a Viking holding around the year seven hundred will be just the ticket. You'll have all you've ever wanted: power, glory, fishing boats... even one of those funny Nordic helmets. It's amazing what micros can do. Within minutes of loading I had become... Steve of Oslo! Proud owner of two ferrets and a fishing boat! My reign of terror was about to commence...

Up to four players can enter the simulation and there are nine levels of difficulty. The computer will ask you a series of questions and your answers dictate how the holding survives. The questions follow a logical sequence through the course of the year. You are told how the weather affected your crops, how much grain is necessary to feed your people, and so on... There are options to train slaves as guards, build market places (should your treasury allow) and buy ferrets. The later are not luxury items as you might imagine, but required purchases to quell the rat population. I found this out to my cost with an outbreak of plague before the paint had even dried on my hut.

Still, you soon get into the swing of things. I lapped the taxes at the earliest opportunity and starved the peasants so as to buy that new temple I'd always wanted. The roar of the fjords was in my blood! Provided you can temper revolts and avoid natural disasters there's nothing to stop you rising from humble Holder to Duke or even King. The game has been carefully designed and is easy to follow. I found it all exceptionally appealing. Now, if you don't mind, I must dash — the peasants are revolting [again]. — S.K.

Game: VIKING
Maker: DRAGON DATA
Machine: DRAGON 32
Format: cassette
Price: £7.95
Rating: KKK



THE GREATEST STORY EVER TOLD?

INFOCOM, AN American company, have been about for several years. They first made their name by writing the excellent *Zork* trilogy, a series of adventures so cleverly written and subtly interwoven that it's got its own *Zork* fan club with stickers and the like.

The INTERLOGIC TM System that Infocom uses to create the adventures has its critics. It works on text only. People who've played *The Hobbit* or *Valhalla* will instantly think "Hah! Garbage!" But look at it this way. Take the pictures out of *Habbitor* or *Valhalla*, and you're not left with a very good adventure. Infocom have used the memory space graphics adventures would otherwise take up and put it towards making a far better game.

This means that Infocom adventures won't have the instant appeal of the pretty (for a Spectrum) pictures, but (as Infocom point out) well-chosen, carefully-selected words paint a mind-picture that no mere primitive 2D image can compare with.

Because the adventures are large and complex, you have to have a disc drive to run them on. And they're only available for the Commodore 64, Atari 800, Apple II and IBM — all American micros. Pity.

Planetfall is of course written in machine code, but because it's so big the bulk of the program is actually stored on disc and called up when it's needed. On the Commodore 64, the command processing time is reasonable, but a touch slow (this I suspect is due to the unbelievably slow disc drive Commodore sells).

At the start of the game, you are a poor, downtrodden ensign (7th level, your ID card informs you bleakly) aboard a spaceship, the S.P.S. FEINSTEIN. You have only your scrubbing brush, and orders from a certain Ensign Cadet First Class Blather, who storms about the ship terrorising innocent ensigns like a cross between a geography teacher and God. You will meet alien ambassadors, a demented robot called Floyd and other characters during your explorations of various planets and deserted institutions. Strange mysteries need to be solved. Identity cards need to be found. And you'll need sleep and food too...

Commands are entered into the computer in full sentences that need almost no modification to be understood. The computer responds intelligently and often very wittily. Another excellent point in *Planetfall*'s favour is that the game is not always exactly the same each time you play it.

K = Could Be Better
KK = Could Be Worse
KKK = Unsurpassable



The major drawback of *Planetfall* is its cost of over £30. In fact, in Lion House, Tottenham Court Road, London, it was going for £37. But it's the best adventure game you'll see for quite some time. — A.G.

Game: PLANETFALL

Maker: INFOCOM

Machine: Commodore 64, Apple II, Atari 800, IBM pc

Format: disc

Price: £30.00

Rating: KKK

This D is really 3

there's movement everywhere! Game object is to guide your android through three increasingly difficult zones and bump off five ferocious Millitoids in each. Hazards come in the forms of Hoverdroids, Bouncers and landmines, all of which are fatal to the android. The screen shows a section of the maze and scrolls smoothly in any direction as the android moves around. Action is fast and challenging, thanks to the 100% machine code programming. There are full on-screen instructions plus joystick option. A thoroughly professional presentation and a must for any library. — R.B.

Game: ANDROID TWO

Makers: VORTEX SOFTWARE

Machine: SPECTRUM 48K

Format: cassette

Price: 5.95

Rating: KKK

NORMAN TEBBIT WRITES...

Personally, I find politics and economics pretty boring. All that stuff about minimum lending rates, wage rounds and economic forecasts. Dreary stuff, man. That was until I discovered 1984 from Incentive Software. This strategy game changed my life by putting me in charge of the Government and the economic survival of the country. It was then that I tasted... POWER! Ha, ha! I love it! Soak the rich! Sponge the poor! Drive up inflation! Send wages through the roof! It's great! You can do all this and more with 1984 or be really boring and try to keep the budget balanced and get through three general elections unscathed. Based on the actual 1982/83 figures for the British economy (3 million unemployed and all) this is a clear, concise, well-presented game. Performance graphs and good prompts on all sections make it an extremely easy game to get into for the novice. It's surprisingly enjoyable. And then there's all that lovely POWER...! — R.B.

Game: 1984 A GAME OF GOVERNMENT MANAGEMENT

Maker: INCENTIVE SOFTWARE

Machine: SPECTRUM 48K

Format: cassette

Price: £5.50

Rating: KKK



When the history of 3D-effect maze games comes to be written, *Android Two* will be marked down as a classic of its kind. A superb attract mode that sweeps you across the maze field gives the first taste of the stunning hi-res graphics and brilliant colour that makes this game so distinctive. When play starts the maze comes to life with bright, bustling objects —

SUPERB SPECIMENS of the programmers art

The Mr. Micro Software and accessory collection
is worthy of close examination.



KEY TO SPECIMENS:

- 1 GOLD RUSH (VIC 20) £6.90
- 2 INVINCIBLE (VIC 20) £6.90
- 3 HUMPHREY (VIC +16K) £6.90
- 4 MYSTERIOUS ISLAND (VIC +16K) £9.90
- 5 DIGGER (VIC +16K) £6.90
- 6 BENGO (VIC 20) £6.90
- 7 AMIGO (VIC +16K) £6.90
- 8 TRIBBLE TROUBLE (CBM 64) £6.90

- 9 LITTLE ICARUS (CBM 64) £6.90
- 10 PANDORAS BOX (CBM 64) £6.90
- 11 HUMPHREY (CBM 64) £6.90
- 12 PUNCHY (CBM 64) £6.90
- 13 HUMPHREY (BBC B) £6.90
- 14 PUNCHY (SPECTRUM 48) £6.90
- 15 CRAZY GOLF (SPECTRUM 48) £6.90
- 16 LIGHTNING ASSEMB/DIS (ORIC) £13.90

- 17 DRACULA (ORIC) £6.90
- 18 RAM DAM (VIC) £13.90
- 19 DRAGON TAMER (DRAGON) £9.90
- 20 SCORE STORE (ALL) £1.95
- 21 HARLEQUIN (SPECTRUM 48) £6.90
- 22 LIGHTNING CODER (VIC 64) £13.90



MR. MICRO

TELEPHONE ACCESS OR VISA ORDERS TO 061-728 2282 (TRADE ENQUIRIES INVITED)

MR. MICRO LTD., 69 PARTINGTON LANE, SWINTON, MANCHESTER M27 3AL, ENGLAND.



spectrum


JOYSTICK INTERFACE MK.II



£12.95

inc. VAT

2 year
manufacturer's
guarantee

- ★★★ The only joystick interface fully compatible with the rapid fire mode of the new Quickshot Mk. II joystick.
- ★★★ Guaranteed 24 hour despatch for orders paid by postal orders, Access card or Visa card.
- ★★★ Guaranteed 7 day despatch on all orders paid by cheque.
- ★★★ Fully operational with  and Kempston compatible software.
- ★★★ Unbeatable price — Unbeatable guarantee — Unbeatable value.
- ★★★ Buy direct from the manufacturers:-

RAM ELECTRONICS (FLEET) LTD., (Dept. BK)
106, FLEET ROAD, FLEET, HAMPSHIRE. GU13 8PA

Please send me:-

- ☐  Interface Mk.II @ £12.95
- ☐ ——— Quickshot Mk.II @ £12.95
- ☐ Interface & Joystick @ £22.95
- ☐  Vic 20 32K switchable ram pack @ £49.95
- ☐  Vic 20 16/36K switchable ram pack @ £34.95

Add £1 P&P (£3 overseas)

Please debit my Access/ Visa card no.

I enclose cheque/ Postal orders

Name

Address

RAM ELECTRONICS (FLEET) LTD. (DEPT. BK)
106 Fleet Road, Fleet, Hampshire GU13 8PA



THE FABULOUS

CASSETTE

50

FROM 

ONLY

£9.95

(inc. P&P and VAT)

VALUE that's out of this world

50 GAMES ON ONE CASSETTE

DRAGON



AIB

Spectrum



ATARI

ORIC-1

ZX81

VIC-20

EXPRESS DELIVERY- ORDER NOW

Name _____

Address _____

Post Code _____

Country _____

Dealers & Stockists enquiries welcome.

Please send me by return of post, Cassette 50 at £9.95 per tape. I enclose a cheque/postal order for

£ _____ made payable to Cascade Games Ltd.

Please debit my  No. _____

SPECTRUM ☐ ORIC-1 ☐ ZX 81 ☐ VIC 20 ☐

BBC AIB ☐ DRAGON ☐ ATARI ☐ APPLE ☒

 Cascade Games Ltd.,
Suite 4, 1-3 Haywra Crescent, Harrogate,
North Yorkshire, HG1 5BG, England.
Telephone: (0423) 504526. BK 4/84

It is impossible to tell you everything about the 50 games on CASSETTE - 50 but they include many types such as maze, arcade, missile, tactical and logic games, to suit most tastes in computer game playing. CASSETTE - 50 will appeal to people of all ages and the games will provide many hours of entertainment for all the family at a fraction of the cost of other computer games.

TWO FOR THE PRICE
OF 1 1/3 GAMES

With every game on the market trying to blow your eyes out of their sockets with dazzling graphics it's nice to come across a couple of games that don't look much but play well. *Alien Swarm* is your basic, no-frills space invaders. Aliens, looking no more ferocious than horses wearing nosebags, rain down on your laser base. You get 50 aliens to start with and a running check is kept on the number remaining. Points value and speed increase after each base hit or wave completed. Keyboard control only but very responsive action. Sound is pretty poor. *Arena* is an absorbing original that has you in control of a small figure at screen centre carrying a moveable shield. Objects ricochet around the arena and come at the figure from all angles. You have to make sure that the shield's in the right position to deflect the object. Points for each deflection, one life (of five) gone if you miss.

Oh yes, and just for good

measure the walls are closing in on you.

Limited side to side movement is possible but uses up energy. Seven skill levels and ten speeds give enough variety for the most demanding player (try speed 0, skill 1 — you won't last 20 seconds!). There's also a useful demo mode. An enjoyable game that combines tactics and plain arcade action. All in all, two good games on this K-Tel Doublesider for under £7. Guess you could call that value for money. — R.B.

Game: ALIEN SWARM/ARENA
Maker: K-TEL
Machine: SPECTRUM 48
Format: cassette
Price: £6.95
Rating: KK

HOLD THE
GARLIC
BUTTER

I guess *Centipede* is one of those games which just can't fail to be exciting. There are literally dozens of versions and all manage to generate a healthy amount of perspiration; you'd have to do something drastically wrong (like forget the *Centipede*) in order to spoil the formula. This one is no exception to the rule.

The graphics are chunky but acceptable, the sound surprisingly butch and the gameplay adequately fierce. There are no less than nine speed variations, of which I found the top three acceptably fast, plus all the usual bonus features. Snails crawl mindlessly across the screen disgorging

K = Could Be Better
KK = Could Be Worse
KKK = Unsurpassable

bucket loads of lethal little 'uns and an elastic snail boings gleefully around your weapons system. Of course the thing calls out for trackball control, but failing that joysticks are a reliable substitution.

Like all Dragon programs it loads with nary a hitch and seems well worth the money. I can also safely predict that this'll be the nearest I get to doing any sort of gardening all year. — S.K.

Game: ULTRAPEDE
Maker: SOFTEK
Machine: DRAGON 32
Format: cassette
Price: £6.95
Rating: KK



FTL IS POSSIBLE

This is a blindingly fast sci-fi dogfight program that thrills through its sheer speed rather than any gaming innovation. You command the Starfighter, a gleaming, high-speed rocket ship whose job is to protect the surface of your planet against alien modules 'n' podules. A rather thankless task that offers few rewards. Speed is all that counts.

Even on the slow option, your Starfighter travels at an eye-aching rate of knots. So much so that it's difficult to control. At first I had a hell of a job just keeping the thing in the air, let alone worrying about all the adversaries on offer. The pips would sound and I'd go haring off into the first available mountain. Still, I eventually managed to get to grips with the rather pendulous motion of the ship and could begin to concentrate on the game. What there is of it. The only variation it offers on the scrolling

dogfight scenario occurs when you exceed certain score points. The screen becomes dark, presumably representing nightfall, and the swarms hatch out. Unfortunately night-time is fleeting and you're soon back where you started.

Like a lot of Dragon software, it's a compromise. The ingredients for a great game are there but none is fully exploited. This comes across as a sort of skeletal *Defender*; had it included a greater variety of aliens, some humanoids to rescue... a generally stronger theme — it may well have been a classic. All in all something of a missed opportunity. — S.K.

Game: STARFIGHTER
Maker: DRAGON DATA
Machine: DRAGON 32
Format: cassette
Price: £7.95
Rating: K

ZAP!
P.O.W.

12

"So, Britisher *schwein*, you dare to escape the Chermans — then suffer the torture of the toothpaste tubes!" It does look this way in this 'Doublesider' cassette from K-Tel — one game seems to be a punishment for enjoying the other. *Castle Colditz* is a reasonable text-only adventure in which you are trying to escape from the notorious WW2 prisoner-of-war camp. On your way out you must collect objects to help you overcome hazards, not to mention picking up a few items of Nazi treasure.

Turn over the cassette to face *Battle of the Toothpaste Tubes* if you dare! You're in control of a large blue toothpaste tube which can shoot bolts of paste at vertically scrolling toothbrushes on the right or drop paste on horizontally scrolling pink tubes below. A silly, confused game that would have been a waste of money sold on its own. — R.B.

Game: CASTLE COLDITZ/
BATTLE OF THE
TOOTHPASTE TUBES
Maker: K-TEL
Machine: Spectrum 48K
Format: cassette
Price: £6.95
Rating: K

GOTCHA!

Picture the scene: You're alone at the base. The chill South Atlantic wind cutting through your long johns... when suddenly the air-raid sirens sound! The enemy have launched a surprise attack on the airstrip and there's only you to protect the place. Time to leap into your jumpjet and scramble! The day of reckoning has arrived.

Unfortunately despite the initial promise of the setting, *Jumpjet* quickly proves itself to be something of an old duffer. The game is agonisingly slow, which is not surprising considering that it's written in Basic, and something of a chore to play.

Having shot down the enemy bombers which threaten your base you're allowed to fly on and attack the opposition's fortress across the sea; however, considering the amount of time it takes to scroll across the landscape you may have second thoughts about undertaking the mission. I know I did.

Graphically, though, it's OK and the program does boast some rather novel computer-speak. As enemy bombers loom overhead, the program will proclaim in somnambulant tones: "Alert! Alert!" and other such similar things. All rather frivolous, but entertaining nonetheless. — S.K.

Game: JUMPJET
Maker: DRAGON DATA
Machine: DRAGON 32
Format: cassette
Price: £7.95
Rating: K



MY EYES! MY EYES!

Postern's *3-Deep Space* for the BBC B is the first 'stereoscopic' 3D game I've ever seen on a popular micro. It is supplied on tape in two parts, the first in BASIC to set up the 3D background, and the second in machine code to actually get all the objects moving at a reasonable speed.

It loaded first time with no errors, the landscape generator loading up first giving your eyes a chance to adjust to the effect. Well, on my monitor at least, it worked up to a point. Something wasn't quite right, because when I moved my head, the object furthest away moved fastest!

The point where a brief message ("S to Start") appeared was where the game began to fall apart. The instructions had neglected to mention which keys to use, but I eventually found them by trying all the possible contenders.

The game itself consists of nasties, who move in one of eight 'depths', coming towards you from the right-hand side of the screen, moving up and down (but not in and out) at

regular intervals. You must sit on the left-hand side of the screen, moving in and out, firing a 'bolt' at the nasties. If a nasty hits you when you are both at the same depth, you lose. Predictably, this gets a little boring after a while, as the marauding aliens take no more exotic shape than simple diamonds. I guess the author (Mike Singleton) used so much memory getting the effect right that he ran out of space for such desirable amenities as complicated aliens. The aliens do change shape at a set score, however, so all is not lost — but you only get one 'life', there's no high score sheet, and I thought he really missed an opportunity for a *Defender*-style explosion in 3D.

The gameplay seems to have taken second place to the gimmick, but nevertheless this program is still worth looking at. Literally. — A.G.

Game: 3-DEEP SPACE
Maker: POSTERN
Price: £
Machine: BBC
Format: cassette
Rating: KK

Wilberforce and Freddie are the best of muckers. They eat in the same vegetarian restaurants and like nothing more than a lengthy discourse on the Meaning of Life while on duty in the royal fields. So just imagine Wilberforce's chagrin when poor old Freddie is abducted by the dreaded Hawk. In desperation he grabs his shotgun and fires.

Now I must admit this peculiar offering had me a little puzzled at first. I read through the instructions, peered at the screen and squeezed my fire button a few times — but had no real idea as to what was going on. 'Blast the flies but avoid the larvae,' I was told. Fine, I thought, but who are the flies? Much pondering was undertaken before the penny dropped. The idea of the game is to save Freddie from the clutches of the Hawk.

This is not a game for those with poor eyesight. The characters are so tiny I had to abandon play for fear of terminal eyestrain. — S.K.

Game: DRAGON HAWK
Maker: MICRO DEAL
Machine: DRAGON 32
Format: cassette
Price: £8.00
Rating: K

WHIRLYBIRD RUN



ONE MORE FOR THE ROTOR ROTA

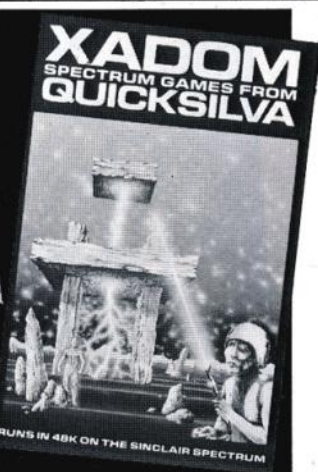
Pleasant if unremarkable version of that *Scramble* clone, *Supercobra*, in which you pilot a mega-helicopter across and through mountainous terrain infested by kamikaze forces. Naturally the idea is to wreak as much havoc as is humanly possible. No, this is not a game of intellectual subtlety.

You begin your run with four ships. Each time one is lost the game restarts automatically at the point you left it. Apart from all the ground-to-air missiles, there's the enemy's fuel depots to look out for. You have to take these out in order to maintain your own supplies, although how this magical replenishment is achieved I can't say. Flying sauc-

ers and rocketballs come as standard but the program lacks an enemy fortress as a climax. For me this rather dilutes its appeal, reducing the action to rather aimless carnage.

The graphics are crisp, if a little simplistic, but the sound is very good with the 'Whup-whup-whup' of the chopper's rotor-blades being nicely reproduced. Be advised that potential pilots will need a joystick to get airborne. — S.K.

Game: WHIRLYBIRD RUN
Maker: DRAGON DATA
Machine: DRAGON 32
Format: cassette
Price: £12.95
Rating: K



I opened the sprayed-gold cassette box and it promptly fell apart. After that things got better.

The Alchemist is you, bub, and you've got to penetrate the inner defences of (yawn) the Evil Warlock, which are terrible and labyrinthine and guarded by the usual crew of plug-uglies.

So far so normal. What makes **Alchemist** refreshingly different and huge fun to play is the all-graphic side to this particular adventure: in a way it reminds me of ColecoVision's **Smurfs**, except that here the play-field scrolls both ways and up and down. Steer the doddering old fool (the Alchemist) along the levels, transform him into an eagle for the levitational bits (a minor masterpiece, this routine, which never failed to bring a surge of satisfaction) and blast the marauding entities with lightning bolts, or a Lesser Spell (if you've found one), or — though I never got this far and can't imagine the effect — the Great Spell, which comes your way once you've found all four missing pieces of the Scroll etc., etc.

While the plot is yet another version of an old, old theme, the graphics really bring the **Alchemist** alive. Me? I kept getting bumped off for lack of Stamina (sort of Survival Points) — but with a little practice I'm going to get further and further into this maze. Animation and scrolling are superbly smooth, colours rich and imaginative, and the general feel one of 100 per cent machine code slickness. A neat conception, beautifully carried through. — T.T.

Game: ALCHEMIST
Maker: IMAGINE SOFTWARE
Machine: SPECTRUM 48
Format: cassette
Price: £6.95
Rating: KKK

Amazing what you can do with five crystal balls, four magic apples and a bit of creative writing. Why, you could almost convince someone this is not another variation on the well worn **Dig Dug** theme. The action is, we are told, set in the lead mines of the ancient mystic land of Zeldor. Here Good Wizard Meltec tunnels about carrying out his eternal quest for lead (blue blobs) which he can change into gold. The mines are, of course, guarded by evil magic meanies (reject space invaders) who chase Meltec all over the place giving the poor chap a very hard time and using up one of his three lives each time they catch him. Meltec's magic doesn't work on Zeldor (so why make him a magician?) so he has to resort to the five crystal balls which he can fire at the meanies and the four magic apples which are scattered about the play area. The only thing 'magic' about these is that they can be dropped on the meanies to squash them (score extrapoints for this) or used to block their path. The crystal balls are only effective at long range as Meltec has to face his attacker. Most of the time he's on the run with a meanie hot on his heels and no time to turn and fire. Graphics are good and speed can be varied over nine skill levels. Sound is good if you can bear the 'Can-Can' repeated endlessly. (My gratitude to the programmer for providing an on-off facility for the sound.) There's also a very good high-score table which can be copied to the printer for those who want to frame their achievements. A fun game, yes. Magic... not really. — R.B.

Game: MAGIC MEANIES
Maker: CDS MICRO SYSTEMS
Machine: SPECTRUM
Format: cassette
Price: £5.95
Rating: KK

Stonkers is quite simply one of the very best general's-eye-view battle simulations around — certainly there's nothing in my knowledge to touch it for the Spectrum. Designer/programmer John Gibson has developed the available memory artfully, preferring to sacrifice some screen area for the sake of high — if miniaturised — resolution on the remainder and what must be enormous amounts of data handling. The result — complete with panic-making tickertape "intelligence reports" which only serve to fluster you — is a fast-moving, multi-screen strategic war scenario.

Your overall map is of a corner of the world vaguely Middle Eastern in profile. You move a cursor to the part you want to zoom on, touch a key... and there you are — the zone in close-up, complete with military units (yours and your enemy's) and full topography. This smaller area will scroll if you push with the cursor; using this facility you "deploy" (i.e. pick up and direct) troops. And — the nub of the opening strategy — each group of units must have their own supply train; or you start getting piteous bleats by way of tickertape. Eventually units peter out altogether for lack of... what can be in those trucks? Then comes the combat.

Much of this game reminds me of the programming style of American designer Chris Crawford, now with Atari, who wrote **Legionnaire** (Avalon Hill) using many of the same quiverful of programming "licks"; automatic deployment, for instance, with units boldly plodding whence they're bidden. The smoothness and reliability of the action and the urbane tricks to delight the eye (the tickertape is great), all testify to a wholly professional piece of work. Kriegspielers will love it. — T.T.

Game: STONKERS
Maker: IMAGINE SOFTWARE
Machine: SPECTRUM 48
Format: cassette
Price: £6.95
Rating: KKK

The vast golden face beamed at me, bathing my awe-struck countenance with radiant light. "My speciality", it said, "is reincarnation. Prepare to return."

I was stuck inside of **Xadom** with **Adventure Blues** again.

Like a spring lamb I flitted and weaved across the floor towards the far wall, where three gateways flickered with ominous lightnings. As Agent Dingbat (somehow I can never stand to type my real name into one of those games that demand a preliminary handle), I had to search the multi-roomed spacedome and locate a missing widget; then escape by means of a pre-planted transporter.

If they can transport me out why couldn't they beam me in? As it is all these drafted 3D rooms look the same in outline, though each one is dotted with two or more kinds of hazards and obstructions, with freelance Minders of various hideous mien to be found in any location. Trickiest of all the room traps is the Dark Maze (tip: try the longest ways to the door of your choice first — you may be pleasantly surprised).

Each time you die — for lack of energy, or by being antimattered (what does it antimatter anyway?) — you get reincarnated — slightly drawn-out, this dying routine. Colours are good, 3D resolution sharp and imaginative, action smooth and the whole thing seems pretty well bug-free. Author Mike Moscoff knows his stuff and **Xadom** is a new way of doing things but somehow — to me, anyway — it failed to come over as a clincher. If you haven't done this one inside a week, is my guess, you won't bother to. — T.T.

Game: XADOM
Maker: QUICKSILVA
Machine: SPECTRUM 48
Format: cassette
Price: £6.95
Rating: KK

The invasion has begun... for BBC Model B

Let excitement invade your home computer!
Travel to Alpha Centauri. Enter the Vortex.
Command the ground missiles, or join the
shoot-out at the O.K. Corral!

ATTACK ON ALPHA CENTAURI

For the BBC Micro Model B

...he punched the key, and
the control monitor filled
with the picture of
bug-eyed wasps attacking
from their volcanic nest;
decisively he dived to the
left and his laser gun burst
into action...
3D ACTION, EXPLOSIVE
SOUND EFFECTS
BBC MODEL B
£7.95 CASSETTE
£11.95 DISK

VORTEX

For the BBC Micro Model B

...there was no escape, he
had to enter the Vortex and
bet on his skills! He
grabbed the manual
controls and with
determination fired both
upper deck guns.
KEYBOARD OR JOYSTICK.
EXCELLENT SOUND
BBC MODEL B
£7.95 CASSETTE
£11.95 DISK

3D BOMBALLEY

For the BBC Micro Model B

...the continued thunder
of the hissing ground
missiles had long now
deafened him - unless he
had some of those
bombers down, the fleet,
in the small stretch of
water was a sitting
duck...
3D ACTION, SOUND
EFFECTS, BEAUTIFUL
GRAPHICS
BBC MODEL B
£7.95 CASSETTE
£11.95 DISK

GUNSMITH

For the BBC Model B

...the movement of the
saloon-bar door was all the
warning he needed! At the
speed of light his hand
moved toward his holster,
while a sixth sense
warned him of the upper
floor window...
3D ACTION, SOUND
EFFECTS, BEAUTIFUL
GRAPHICS
BBC MODEL B
£7.95 CASSETTE
£11.95 DISK

Available from WH Smith, HMV, all
Spectrum shops and over 500 retail
outlets in the U.K.

Do you write your own
programmes? If you have
an unusual programme
which can meet our
standards you could be
earning more than £250 per
week. Why not take
advantage of our sought
after reputation. Write now!

SOFTWARE
INVASION

50 Elborough St.
Southfields,
London SW18 5DN.
Tel (01)870 1197

• Distributors, Multiple Store and
Retailer Group inquiries invited.

HOW TO ORDER

You may purchase any of the Games
listed from most good BBC Software
Stockists, WH Smiths, HMV or your
nearest Spectrum Dealer.

To order direct, fill in the coupon below
with your requirements, make
cheque/P.O. payable to: SOFTWARE
INVASION and post to us. Please allow 7
to 14 days for delivery.

Post to: SOFTWARE INVASION 50 ELBOROUGH STREET SOUTHFIELDS LONDON SW18 5DN

(Title) _____ (Qty) _____ £

☐ (TAPE) ☐ 40 TRACK
☐ (DISK) ☐ 80 TRACK (Please tick)

(Title) _____ (Qty) _____ £

☐ (TAPE) ☐ 40 TRACK
☐ (DISK) ☐ 80 TRACK (Please tick)

(Title) _____ (Qty) _____ £

☐ (TAPE) ☐ 40 TRACK
☐ (DISK) ☐ 80 TRACK (Please tick)

(Title) _____ (Qty) _____ £

☐ (TAPE) ☐ 40 TRACK
☐ (DISK) ☐ 80 TRACK (Please tick)

Total £

I enclose my cheque/P.O. for £ _____

NAME _____

ADDRESS _____

TEL: (Day) _____ TEL: (Eve) _____

☐ I am a Distributor/Multiple/Retailer/Dealer.
Please contact me.

(Please delete whichever not applicable)

Space Pilot

**A 64K
BLOCK
BUSTER**

**COMMODORE
64**

ANIROG

ANIROG SOFTWARE LTD.,

Trade Enquiries:

29 WEST HILL DARTFORD KENT (0322) 92513/8

Mail Order:

8 HIGH STREET HORLEY SURREY

24 HOUR CREDIT CARD SALES HORLEY (02934) 6083

PAYMENT BY CHEQUE P.O. ACCESS/VISA

50p POST & PACKAGING

SPACE PILOT

Fight your way to become The Master of the Skies travel through time to overcome the enemies of the past and future. Engage in dog fights with the squadrons of world war one to the fighters of the year 2084. Five Screens of Breathtaking Scenic Graphics.

J.S. £7.95

THUNDERHAWK



Blast the Albertron Birdcraft from the skies!
SAVE YOUR PLANET!
 Spectrum 48K
*Joystick compatible
 Full colour
 epic.*

You are pitched against the evil enemy who are set to destroy your race. Multiple levels of fast action bring you to the command centre of the Battle Fleet, can you finish the job?

LYVERSOF

Golf

THUNDERHAWK (48K Spectrum)

Golf (48K Spectrum)

Voyager (VIC 20, 8 or 16K)

Liberator (16K/48K Spectrum)

Picture Puzzle (Dragon 32)

Riddle of the Sphinx (VIC 20, 8 or 16K)

Android Invaders (Dragon 32)

Bird of Prey (Basic VIC 20)

Hopping Mad (VIC 20, 3.5K Exp.)

all at
£5.95
 each

Please debit my Access/Barclaycard (delete as necessary)

CARD NUMBER

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

I enclose cheque/P.O. for £ _____

Name _____

Address _____

LYVERSOFT, 66 LIME ST., LIVERPOOL L1 1JN
Tel: 051-708 7100

- THUNDERHAWK** (48K Spectrum)
- Golf** (48K Spectrum)
- Voyager** (VIC 20, 8 or 16K)
- Liberator** (16K/48K Spectrum)
- Picture Puzzle** (Dragon 32)
- Riddle of the Sphinx** (VIC 20, 8 or 16K)
- Android Invaders** (Dragon 32)
- Bird of Prey** (Basic VIC 20)
- Hopping Mad** (VIC 20, 3.5K Exp.)

all at
£5.95
 each

Please debit my Access/Barclaycard (delete as necessary)

CARD NUMBER

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

I enclose cheque/P.O. for £ _____

Name _____

Address _____

LYVERSOFT, 66 LIME ST., LIVERPOOL L1 1JN
Tel: 051-708 7100

More than fun and games!

FIRST STEPS with the Mr. Men

by Primer Educational Software

The ever-popular Mr. Men help prepare young children for reading with four simple and absorbing games designed to exercise essential skills as well as entertain.

An easy-to-use, colour-coded key guide is included with an illustrated introductory book, featuring the Mr. Men. For ages 4 to 8 years. Available now on cassette for the BBC B, Spectrum 48K and Electron **£8.95**.



QUICK THINKING!

by Widgeit Software

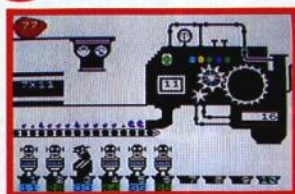
Two mind-stretching, space-age games to test mental arithmetic and nimble fingers.

In **Sum Vaders** alien robots invade the earth. Only quick thinking and fast reactions can prevent them. Several levels of difficulty and a two-player game with a handicap option make Sum Vaders equally testing for all family members, from 8 years to adult.

Robot Tables challenges the young player to make a series of perfect robots.

Knowing your multiplication tables is the key to controlling the robot-making machine. With a learning mode and a testing mode, Robot Tables is a fun way

for early learners, and more advanced children, to master an important and often neglected skill.



Available now on cassette for the Spectrum 48K, Commodore 64, BBC B and Electron **£6.95**.

CAESAR THE CAT

by Andromeda Software

Meet Caesar, a cheeky young cat on duty in a well-stocked larder. He's kept busy chasing a gang of hungry mice eating the family's food. Playing against the clock, you guide Caesar along crowded shelves to pounce on the mice.

A fast, colourful, all-action, arcade-style game with catchy music and a best-score record. Challenging for high-scoring arcade addicts as well as great fun to play for the novice. Available on cassette for the Commodore 64 **£8.95**.

**NOW ON
SPECTRUM 48K
£6.95**



Prices include VAT and post and packaging. MIRRORSOFT programs are available from selected branches of W.H. Smith and Boots, and other leading software stockists. Trade enquiries welcome: phone 01-822 3580.

MIRRORSOFT

SOFTWARE FOR ALL THE FAMILY

To MIRRORSOFT, PO Box 50, Bromley, Kent BR2 9TT

Please send me the following (enter number required of each item in the space provided):

	Price	Spectrum 48K (01)	BBC B (03)	Electron (04)	Com 64 (05)
First Steps with the Mr. Men (MM01)	£8.95				
Quick Thinking (QT01)	£6.95				
Caesar the Cat (CC01)	£8.95				
Caesar the Cat (CC01)	£6.95				

I enclose a cheque/PO for £..... made payable to "Readers' Account: Mirror Group Newspapers Ltd".

I understand that my remittance will be held on my behalf in the bank account named above until the goods are despatched.

Or please debit my ACCESS/BARCLAYCARD for the sum of £.....

card no:

BK1

Signature.....

Name.....

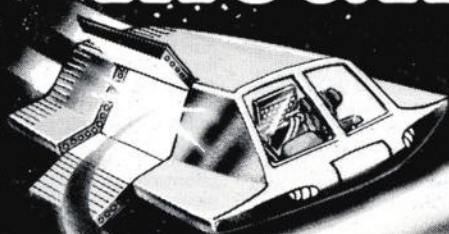
Address.....

Postcode.....

Offer applies to Great Britain and Eire only. Please allow up to 28 days for delivery in the UK. MIRRORSOFT is a registered trade mark of Mirror Group Newspapers Ltd., Co. Reg. No. 168660 Reg. Office: Highborn Circus, London EC1.

R&R**SOFTWARE**

means value



At R&R we believe that value comes first, and we make it our business to ensure that we provide good quality programs at realistic prices... for your enjoyment.

ALL ARCADE GAMES NORMALLY HAVE CHOICE OF KEYBOARD OR JOYSTICK CONTROL. Should you have difficulty in obtaining our products from your local Dealer please send cheque or Postal Order indicating titles required, for return of post service.

CHOPPER X-1

(For any ZX Spectrum)

You command the Spectrum Chopper X-1 Gunship—Your mission is to repel invading forces and save the earth. An action packed original game in full machine code

R.R.P. £5.50

GALAXY WARLORDS

(For any ZX Spectrum)

A fast action machine code space game in which you defend your position as Galaxy Warlord against attacking enemy starships. Both your patrol-ship and rockets are steerable. The enemy never seem to give up! Full colour action graphics and sound for just

R.R.P. £5.50

JUNIOR ARITHMETIC

(For any ZX Spectrum)

An excellent educational program for 6-9 year olds. The fun way to learn and practice Addition, Subtraction, Multiplication and Division. Mistakes are corrected and explained, along with a running total of correct answers. Terrific value at just

R.R.P. £4.95

SPECTIPEDE

(For any ZX Spectrum)

Enjoy the thrill of this full machine code arcade game. Battle to keep the Spectipede at bay but watch out for a very unpredictable spider which is out to get you. For 1 or 2 players with top score and on screen high score feature.

R.R.P. £5.50

GOLF

(For any ZX Spectrum)

Enjoy a game of golf in the comfort of your own home! With the choice of a 9 or 18 hole course and the challenge of Fairway, Rough, Trees, Bunkers, Water & Green. Displays are in realistic colour graphics with full score cards. No two games are alike!

R.R.P. £3.75

GNASHER

(For any ZX Spectrum)

The "famous" arcade maze game with fast machine code action, excellent graphics, colour and sound! Eat up all the dots before the Ghosts eat you, or beat them to an energy pill which will allow you to eat them! Hours of addictive fun with on-screen scoring and high score tape-save capability for just

R.R.P. £4.95

STAR TREK

(For 48K Spectrum only)

One of the original computer space games, but this program has many up-dated features, normally only found on larger computer versions. Test yourself as Starship Commander as your mission takes you to the outer reaches of the Galaxy to protect Federation Space. The Starship and yourself! Excellent value at

R.R.P. £4.95

OTHER COMPUTERS?

Send S.A.E. for a full list of our growing range of software now available for ZX81 and ORIC computers

R&R**SOFTWARE**

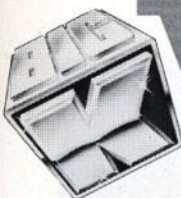
DEALER ENQUIRIES WELCOME

R&R Software Ltd.
5 Russell Street, Gloucester GL1 1NE.
Tel (0452) 502819

CALLING ALL PROGRAMMERS...

WANTED New, Quality Software.
Send us your latest Program
for evaluation - NOW.

AVAILABLE FROM LEADING DEALERS NATIONWIDE



WOZ

IF STEVE WOZNIAK were to walk by you on the street he would hardly rate a second glance. If he were to brush against you in a video games arcade he would seem like any other laid-back Californian hooked on binary.

Perhaps the word which keeps springing to mind when thinking of Steve is "ordinary". After all, for a 33-year-old hippy-generation American he looks plain ordinary. He works for a large US corporation, has his phone number in the book, and used to be very shy. His spare time is spent playing with computers or with his young son, while jogging and playing tennis keep him active.

Yet underneath this unremarkable exterior hides a brilliant mind.

Back in 1975 — an era when major computer manufacturers still found it almost impossible to market software and had to resort to giving it away with the computers — Steve became responsible for the most tremendous shake-up in the computing industry yet seen.

He invented the first personal computer. Not only that, he worked on that prototype in a den in his garage until it was a better model. This latest creation became the Apple II, of which over a million have been sold since its launch in 1976. What is even more amazing is that Steve managed to design

No, it's not a game — it's a name. The name of the man who, by inventing the personal computer, started This Whole Thing. JENNY PARROTT went on-line to Mr Apple...

and build the machine totally single-handed, as well as developing all the electrical engineering and software himself at that stage.

So what is it that is so special about the Apple II?

Quite simply it was the first of a completely new genre. Not only did it look like a desirable gadget, but it was also relatively easy for the non-computer buff to get something up on the screen. Moreover it was affordable.

Steve explains how he sees it: "The first Apple computers were not even designed as products. They were just designed to demonstrate at the local show and there was no intent to start a company, or have a product or anything."

"We took a lot of very unusual steps with the Apple II. By this I mean it was the first computer ever sold in a plastic case, with built-in colour and graphics as standards. It was the first of the low cost computers where the keyboard and video display were standard. It also used the highest density RAMs of the day, so it was state-of-the-art and there were a lot of things about it that all the other

computers were doing a different way.

"All I cared about was having a PC board on my floor and a bunch of wires connected to my keyboard. It was Steve Jobs who had the more far-reaching ideas of a product that could be sold, that could be taken out of a box already completely built and ready to be plugged into a wall, and then used to write a program."

Job's worth

"I thought pretty much as an engineer and a hobbyist and it was a good combination. But, you know, it is kind of like everything we did — just without knowing it at the time we had all the right things all together in one place and that is why we were successful."

Steve Jobs has been a strong influence in Steve's life since college days, always having the suss to get the most out of Steve's wacky ideas.

While they were both studying Steve happened to read an article in a magazine which explained that certain tones sent along a telephone line by a device allowed the user to have

access to free phone calls. Naturally, Steve set about designing his own version of this device and soon came up with a tool which enabled him to call all over the world for free. Steve Jobs became a partner and soon the pair were doing a lively trade selling this device to other students.

Not surprisingly the phone company was not too pleased and pointed out it was illegal — in fact they fined him heavily. "But when you are a school kid this word illegal sure does have a different meaning. It was not like doing something you could get punished for," Steve explains, although the end result was to turn his attentions to studying video and electronic circuits, terminals and modems.

"I think that one of my interests is essentially getting into some Artificial Intelligence research but I am not really involved in that yet. I am a little more earthy right now and am wondering what will make real sense to normal consumers in the next couple of years."

"Eventually I do want to

Continued on page 70



Left: The Doomed Apple III
Right: The megahit IIe

Right: LISA, named after Steven Jobs' daughter

NIIAK

This man is
RICH (the suit
tells the story)





BOMB RUN

by PAT
COOPER

```
90 PAPER4: INK3
99 PRINTCHR$(17)
100 TEXT:RELEASE:RESTORE
110 CLS:PLOT5,10,"Do you want
instructions?"
120 GETA$: IFA$="Y" THEN 300 ELSE 1000
130 REM
140 PLOT11,9,12:PLOT12,9,"PERFECT
LANDING"
150 RESTORE
160 RETURN
170 REM
180 EXPLODE
190 PLOT9,9,"Oh dear, you've crashed"
200 WAIT500
210 RETURN
230 REM
240 PLOT11,11,"Another Try ? (Y/N)"
245 GETA$
250 IFA$="Y" THEN RETURN
260 IFA$ "<" "N" THEN 245
270 PAPER0: INK7: CLS: PRINTCHR$(17): END
```

You are the highly-trained pilot of a super-sophisticated ground attack plane, bristling with deadly armament. Your mission? To clear the ruined city of your country's sworn enemies.

Simple? Not quite. Your target is at the very limit of your fuel endurance — and in addition, a great deal of the gutted city remains, making your low-level passes quite breathtakingly hazardous. Can you survive? To find out, load and run . . .



```

300 CLS:PRINT:PRINTSPC(15)"BOMB RUN"
310 PRINT:PRINT:PRINT"Your bomber is
running out of fuel and you've got to
find ";
320 PRINT"somewhere to","land."
PRINT:PRINT"To do this, the buildings
below have got to be demolished."
340 PRINT:PRINT"To increase height,
press the Cursor Up key, but keep an eye
";
350 PRINT"on the Fuel."
355 PRINT:PRINT:PRINT"Skill level
(1=Easy,5=Hard)";
370 INPUT:A:IFA<10RA>5THEN370ELSE1000
400 REM
410 CLS:GOSUB700
450 FORX=1TO35STEP2
460 :FORY=INT(9+(RND(1)*15-D))TO26
470 :PLOTX,Y,"[ ]"
480 :NEXTY:NEXTX:H=3
490 RETURN
500 REM
520 J=K+1:G=X:F=1:IFJ>26THENRETURN
530 IFSCRN(G,J)=91ORSCRN(G<J)=93
THENW=W+1
540 PLOTG,J," "
550 RETURN
600 REM
610 PLOTG,J," "
620 IFW=2THENW=0:F=0:EXPLODE:RETURN
630 IFJ=26THENW=0:F=0:EXPLODE:RETURN

```

```

640 J=J+1:B=B+1:GOTO530
700 FORCR=1TO6:READC
705 FORCH=#B400+B*CTO#B400+B*C+7:READR:
POKECH,R:NEXT: NEXT
710 DATA123,48,56,28,63,59,54,1,3,{
720 DATA124,0,0,0,63,59,54,1,3,{
730 DATA125,0,0,0,62,31,62,60,0,0,{
740 DATA95,0,10,14,4,14,14,14,4,
750 DATA91,31,18,18,31,31,18,18,31,{
760 DATA93,62,18,18,62,62,18,18,62,{
770 RETURN
1000 REM
1010 D=A: L=4: F=0: W=0:FL=30-INT((
RND(1)*D*4+1)):GOSUB400
1020 FORX=1 TO 36
1030 : K=H
1040 : IFSCRN(X+2,H)<>#20 ORSCRN(X,H)<>
#20 THENL=L-1:PLOTX+3,H," ":EXPLODE
1050 : PLOTX,H,"{ }":PLOT1,0,2
1060 : PLOT25,0,"LIVES: ":PLOT32,0,
RIGHT$(" " +STR$(L),2)
1070 : PLOT3,0,"FUEL: ":PLOT9,0,RIGHT$(
" " +STR$(FL),2)
1080 : IFL=0 THENGOSUB 170: GOSUB 230:
GOTO100
1090 : X#=KEY#
1100 : IFX#=CHR$(10)ANDF=0 THEN
GOSUB500ELSEWAIT(10)
1110 : IFX#=CHR$(11) ANDFL>0ANDH>3 THEN
H=H-1:FL=FL-1
1120 : IFF=1 THEN GOSUB 600
1140 : PLOTX,K," "
1150 : IFH>25 ANDX=35THEN PLOT
35,26,"{ }":GOSUB 130: A=D+1: GOSUB 230:
GOTO1000
1155 : NEXT
1160 H=H+1
1170 GOTO1020

```

FRESH MINTY EGG

EGG & SPOON RACE COMPETITION!

Hundreds of prizes to be won!

1ST PRIZES - 3 BBC MODEL B MICRO COMPUTERS

2ND PRIZES - 5 RALEIGH BMX BURNER BIKES

3RD PRIZES - 5 RALEIGH SAFARI BIKES

50 HANIMEX PERSONAL STEREO RADIO CASSETTES

RUNNERS UP PRIZES - 500 SPORTS BAGS



How to Enter

Using your skill and judgement and all the information contained in the above picture, spot where you think the centre of the missing egg is most likely to be. With ball-point pen indicate the spot with a cross, taking care to place the exact centre of the cross over the centre of the egg.

You can make up to 20 attempts on this page but for every cross you must enclose a wrapper from a Fresh Minty Egg. All crosses must be separate and must not overlap. Remove this page and send it as your entry with the required number of wrappers, together with your name and address completed in the section provided, to the competition address:

"Fresh Minty Egg" Egg and Spoon Race Competition
Parkmount (Sales Promotions) Limited
107-109 High Street
Brentford
Middlesex
TW8 8AX

to arrive not later than 31st May, 1984.

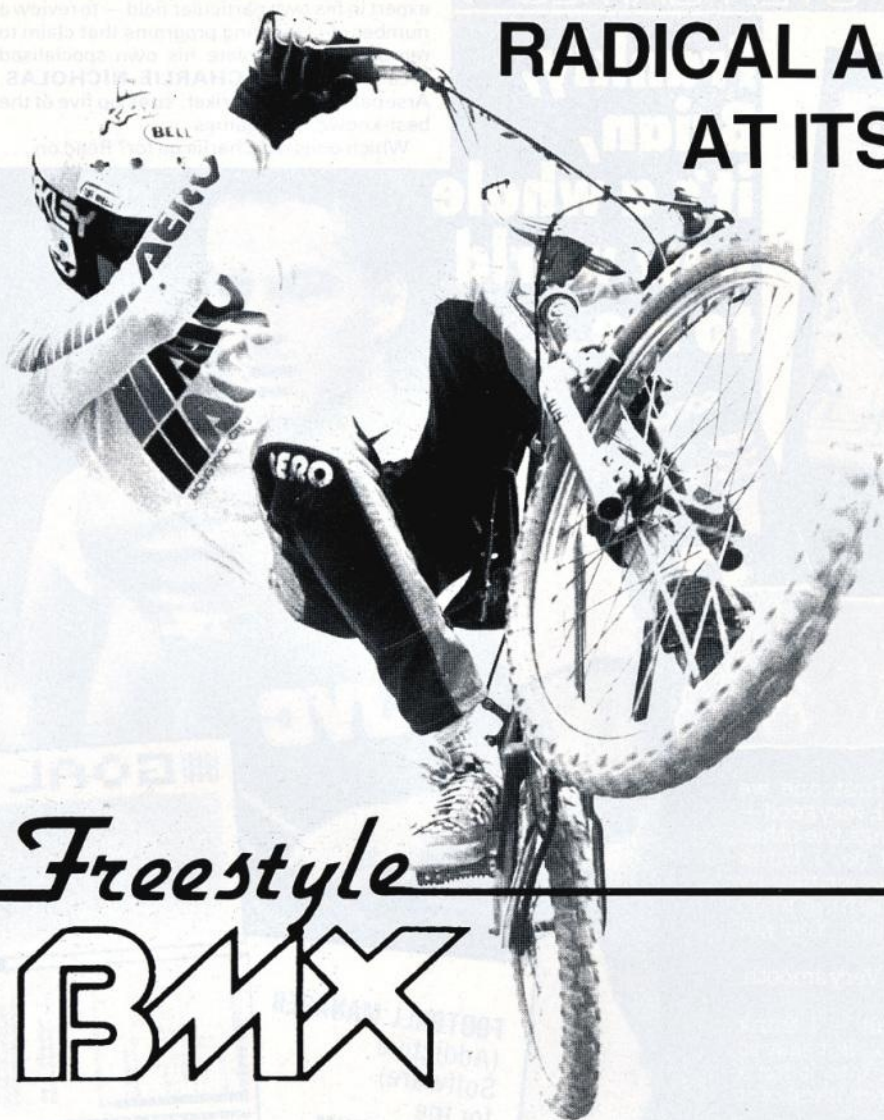
Abridged Rules

1. Competition open to UK residents, excluding employees of Rowntree Mackintosh plc (or their families) and their agents.
2. All valid entries will be scrutinized, and prizes awarded to those competitors whose crosses centre most closely on the position where the judges consider the centre of the missing egg would be.
3. Full rules available on application with s.a.e. to competition address.
4. Closing date for entries 31st May, 1984.
5. The judges' decision is final and no correspondence will be entered into.
6. Prize winners will be informed by 30th June, 1984.
7. No entrant may win more than one prize.

Name _____

Address _____

**RADICAL ACTION
AT ITS BEST**



Freestyle **BMX**

ISSUE No.1 AVAILABLE ON FRIDAY MARCH 23
FEATURING BRITAINS ONLY PROFESSIONAL
BMX RIDERS *Mike Pardon & Andy Preston*

**ONLY 50p AT YOUR
LOCAL NEWSAGENTS**

Go for it





Frankly, Brian, it's a whole new world to me...

Each month, we'll be enlisting the services of a famous non-hacker — an unchallenged expert in his own particular field — to review a number of competing programs that claim to reproduce or simulate his own specialised area. This month, **CHARLIE NICHOLAS**, Arsenal F.C.'s star striker, sizes up five of the best-known footy games.

Which ones did Charlie go for? Read on...

SOCCER
(Intellivision)
for the
INTELLIVISION
game system
(£19.95 or less)
ROM

Realism: 'This was the first one we tried? I think it was, overall, very good — it could do 75% of the things the other (Thorn-EMI) game could do. I think maybe the fact that it was written by Americans may have something to do with it. A very good effort. You got involved all right.'

Graphics: 'Very, very real. Very smooth. Good colours.'

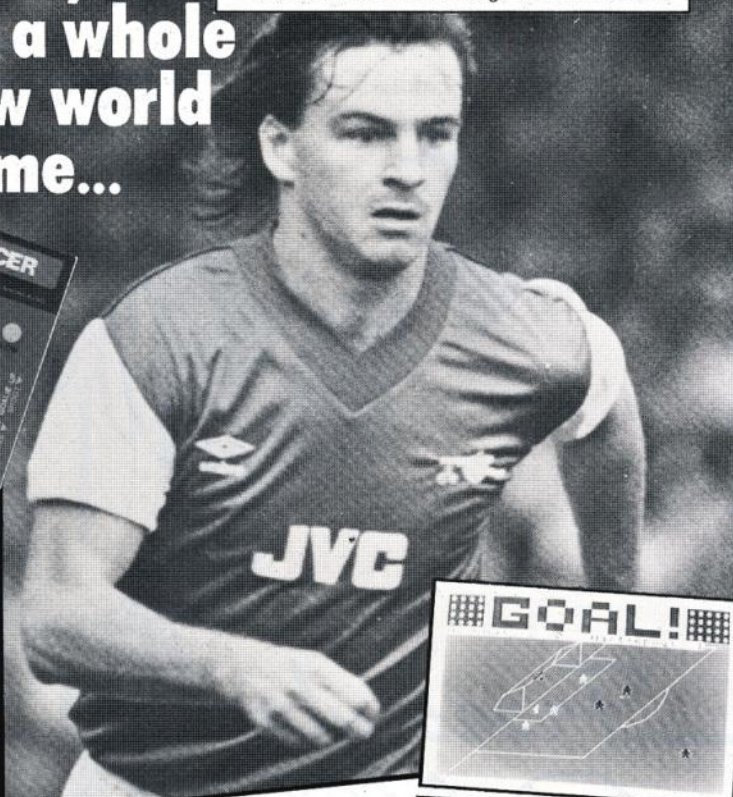
Play action: 'More difficult — I think because of this disc control. But easy to get into once you've been into it for a minute or two — you get the hang of it pretty quick. Good.'

SOCCER
(Thorn-EMI)
for the
ATARI 400/800
(£24.95)
ROM

Realism: 'Overall this is easily the most realistic display. You really feel totally involved with the game. I think it's absolutely superb.'

Graphics: 'Excellent. Faultless.'

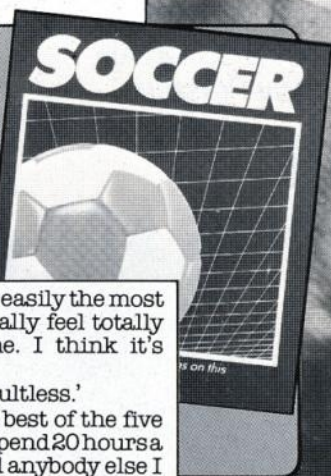
Play action: 'By far the best of the five overall — I could easily spend 20 hours a day with this — so could anybody else I know. Fantastic — great stick response.' (NB: We used Suncom joysticks.)



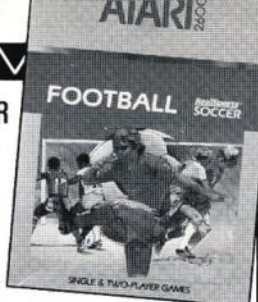
FOOTBALL MANAGER
(Addictive
Software)
for the
48K SPECTRUM
(£6.95)
cassette

Overall comment: 'In all my years of playing with toys — ever since I was a kid anyway — I've never imagined in all that time that anything like this could exist. I've been a professional footballer for seven years now and I tell you I could play this 24 hours a day and never get tired of it. I'm not even sure it's a game at all. It could even be useful — to football managers! If Don Howe [Arsenal manager] took this home — or any other manager — I guarantee they'd do well on it. Their ideas would come out. The different things you can do ... like putting players up for sale ... it's incredible.'

'The Highlight sequences are pure magic. And then you have to sit on the sidelines and sweat it out! Completely fantastic. I want one!'



FOOTBALL/SOCCER
(Atari)
for the
ATARI 2600 VCS
game system
(£19.99 or less)
ROM



Realism: 'I'd say this was more primitive, for young kids maybe? It was very fast — too fast. As soon as you lost the ball it was in the goal! The ball was never out of play! For that reason it was more low-par than the others I saw. You lost interest after a few minutes.'

Graphics: 'Again, pretty primitive really.'

Play action: 'Too fast. You'll never see real footballers leaping about like that. You can only control one player. Overall? Not bad, but I have to say, not as good as the others. Though I should say they're all far better than I'd ever expected.'

THE NICHOLAS LEAGUE

Division 1

1. FOOTBALL MANAGER (Addictive Software)
2. SOCCER (Thorn-EMI)
3. FOOTBALL (Vectrex)

Division 2

4. SOCCER (Intellivision)

Division 3

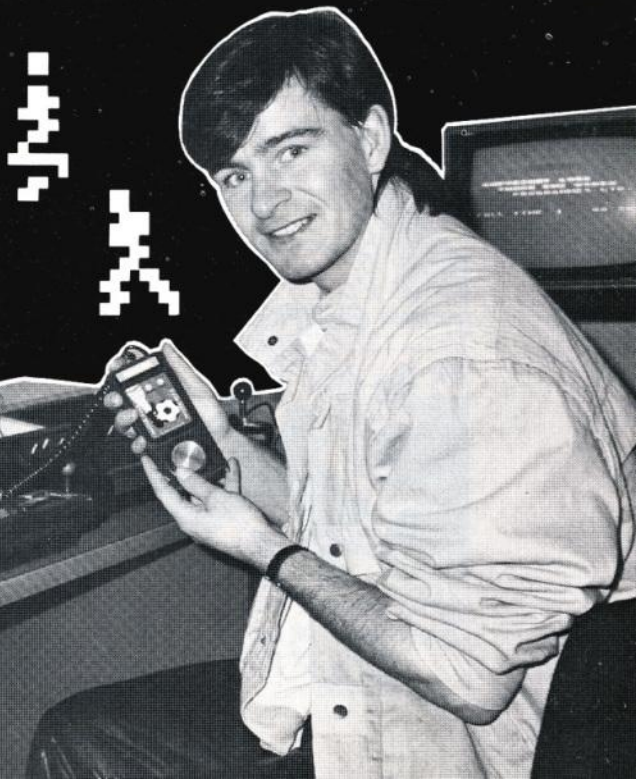
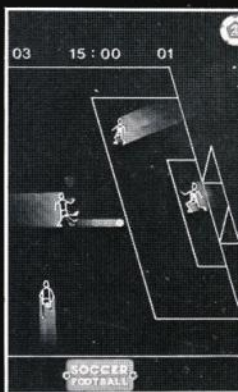
5. FOOTBALL (Atari)

FOOTBALL
(Vectrex)
for the
VECTREX
game system
(£29.95 or less)
ROM

Realism: 'Totally different, but very, very good all the same. A different system of graphics? You can see that. I loved the detail — the way when the ball went out of play the boy immediately went to get it. A nice touch — very realistic. This sort of thing gets you involved. You could play this for hours and never be bored with it... unless you don't like football.'

Graphics: 'At first all you see is a lot of lines — then they all flow together and you realise what's happening! Excellent.'

Play action: 'Weirdly enough, as good as the best one — the Thorn one. The speed everything happens is just right. It all flows together. 100% realistic.'



THE
AMAZING
ADVENTURES OF THE

LAUGHING



GSH
World of Subversive Humor

**PART
FOUR**

AFTER SPENDING CHRISTMAS WITH HIS FRIEND-THE FRANTIC FERRET-THE LAUGHING SHARK WAS FEELING SOMEWHAT GREEN AROUND THE GILLS.



WHAT HE NEEDED WAS SOME VIRGIN GAMES EXCITEMENT TO WORK OFF THAT CHRISTMAS PUD' PAUNCH

HED HEARD THAT HIDEOUS BILL NEEDED HELP IN RESCUING GORGEOUS GRETA FROM THE GI-GANTS



BILL SHOULDN'T BE TOO HARD TO FIND, KEEPING HIS STRENGTH UP, AS HE DID, BY EATING HUGE AMOUNTS OF BAKED BEANS. A CASE OF FOLLOWING ONE'S NOSE!

IF OUR HERO WAS IN NEED OF MORE EXCITEMENT

HE COULD TRY **FUN-PAC 2**



OUTDRAW **GUNFIGHTER** IN ABILENE



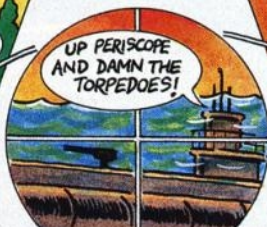
ESCAPE THE MUGGER IN A DARK CITY ALLEY



OR PILOT **STARSHIP SUPERNOVA**



HOW ABOUT A NICE QUIET ROUND OR TWO OF **GOLF??**



JUST ONE OF THE SUPER GAMES IN **FUN PAC 3**. FOLLOW GOLF WITH AN UNDERSEA CRUISE IN **SEAWOLF** - THEN ON TO....



A **NUCLEAR DISASTER** TO SAVE A SCIENTIST OR TWO. (WITH A LITTLE HELP FROM ANDY ANDROID)

SHARK



VIRGIN GAMES ARE:

VIC 20	MISSION MERCURY	£7.95
VIC 20	ENVIAM 8K	£5.95
VIC 20	CREEPERS 3/8K	£5.95
SPECTRUM	YOMP 16/48K	£7.95
SPECTRUM	STARFIRE 48K	£7.95
SPECTRUM	SHEEPWALK 48K	£7.95
SPECTRUM	GOLF 16/48K	£7.95
SPECTRUM	LOJX 48K	£5.95
SPECTRUM	MANAGER 48K	£5.95
SPECTRUM	QUETZALCOATL 48K	£5.95
SPECTRUM	ROBBIE 48K	£5.95
SPECTRUM	SPECTRUM 48K	£5.95
SPECTRUM	LOST 48K	£5.95
SPECTRUM	THE ISLAND 48K	£5.95
SPECTRUM	GHOST TOWN 48K	£5.95
SPECTRUM	RIDER 16/48K	£5.95
SPECTRUM	DR FRANKY & THE MONSTER 48K	£5.95
SPECTRUM	HILLER CAVERNS 16/48K	£5.95
ORIC	THEM 48K	£5.95
ORIC	DEATH CRUISE	£6.95
ORIC	1 CHING	£6.95
ORIC	CASTLE ADVENTURE	£6.95
ORIC	UXE	£6.95
ORIC	FALCON PATROL	£6.95
ORIC	BITANIA	£6.95
ORIC	HIDEOUT BILL	£7.95
ORIC	BIG BOMB	£7.95
ORIC	LANDFALL	£7.95
ORIC	SPACE ADVENTURE	£7.95
ORIC	TRENCH	£7.95
ORIC	OWZAT	£7.95
ORIC	CHIEFTAIN	£7.95
ORIC	MICROBE	£7.95
ORIC	PLANKWALK	£7.95
ORIC	CRUNCHER	£7.95
ORIC	NOB-A-BLOC	£7.95
ORIC	ROBOPODS	£6.95
ORIC	FUN-PAC 1	£6.95
ORIC	FUN-PAC 2	£6.95
ORIC	FUN-PAC 3	£6.95

VIRGIN GAMES GANG

OUR GANG is growing in numbers all the time and everybody who buys one of our new games will receive from the **LAUGHING SHARK** an invitation to join the Gang for one year, absolutely **FREE**. Gang members will receive a quarterly newspaper packed with irrelevant pictures and information and lots of special offers.

THE "I WANT TO BE RICH AND FAMOUS DEPT"

We are always keen to receive any **ORIGINAL ENTERTAINING PROGRAMS** with good graphics at our now famous **"I WANT TO BE RICH AND FAMOUS DEPARTMENT"** from any of you programming mega-stars out there. **DON'T DELAY - SEND TODAY!**

PRESS REVIEWS

For a leaflet containing reviews from our current range of games please write to the **"IF YOU'VE GOT THEM, FLAUNT THEM DEPARTMENT."**

NEW RELEASES



HIDEOUS BILL AND THE GI-GANTS

by Steve Lee for the Commodore 64 (VGA 6003).
By the author of the best seller "Falcon Patrol" a three-part tale of heroism and romance. Try not to let the amazing graphics and sound distract you as you help Hideous Bill to rescue Greta from the depths of the Gi-Gants' nest and thus get his surprise. **£7.95 R.R.P.**
Joystick



THEM - a paranoid fantasy

by Andy "Grun" Green for the Oric 48K (VGC 5002).
A five-part paranoid fantasy by one of the best selling Oric authors. Can you avoid Them; build the blockbuster, dispel the demons, avoid the uncertainty machine, escape the conveyor belt of doom to finally become a soul-saver! **£5.95 R.R.P.**



FUN-PAC 2 - (VGB 7003).



FUN-PAC 3 - (VGB 7004).

by Peter J. Finkle for the T99/4A.
Three fun-packed games for the price of one. Our Fun-Pac cassettes are not just "compilation" tapes but, offer genuine value for money.

FUN-PAC 2 -
1) Escape the Muggers - a game of strategy and skill.
2) Starship Supernova - an exciting adventure set deep in space.
3) Gunfighter - a game of nerve and reactions for 1-6 players. **£6.95 R.R.P.**

FUN-PAC 3 -

1) Nuclear Disaster - an unfortunately topical subject. Can you save the scientists from contamination from the leaking radiation.
2) Golf - All the fun of the course without getting wet! For 1-4 players with 1-18 hole option.
3) Sea Wolf - as commander of the submarine Sea Wolf, it is up to you to destroy the enemy ships. **£6.95 R.R.P.**



DOCTOR FRANKY AND THE MONSTER -

by Martin Wheeler for the Spectrum 48K (VGC 1011).
A stunningly graphical, nine-screen game. Can you help Dr Franky revive his monster, arcade action, action-packed. **£5.95 R.R.P.**

MAIL ORDER

All our programs are available at normal retail price including postage and packing, direct from our **"MY LOCAL DEALER HAS GONE OUT OF BUSINESS BECAUSE HE NEVER STOCKED YOUR GAMES DEPT"** at 61-63 Portobello Road, London W11 3DD.

COLOUR CATALOGUE

If you would like a copy of our **FREE 16-PAGE, COLOUR CATALOGUE** (listing details of all our games, complete with screen shots), please write to the **"RUSH ME A KOSHER BROCHURE PRONTO TONTO DEPT,"** enclosing an A4 SAE with 17p stamp.

FREEZ' BEES!

48K
SPECTRUM

"DOING THE SNO' SHOE SHUFFLE"



All games
only

£5.95

Inc VAT and P&P
for a free catalogue
send SAE.

SILVER SOFT

Selected titles available at
Boots, W.H. Smith, J. Menzies, Laskys
and all good computer stores.

Dealer enquiries welcome Tel: 01-748 4125

Silversoft Ltd, London House, 271/273 King Street, London W6.



Dragon Dungeon



"KLARTZ & the Dark Forces"

(A unique Multi-Adventure)

An interlinked series of adventures set in different time zones and on different planets

The date is 1236 T.A. That is to say, the one thousand, two hundred and thirty-sixth year of the Time After the rising Klartz, Lord of All Darkness. Little remains from the Time Before, except for a few isolated human colonies, scattered around the galaxy.

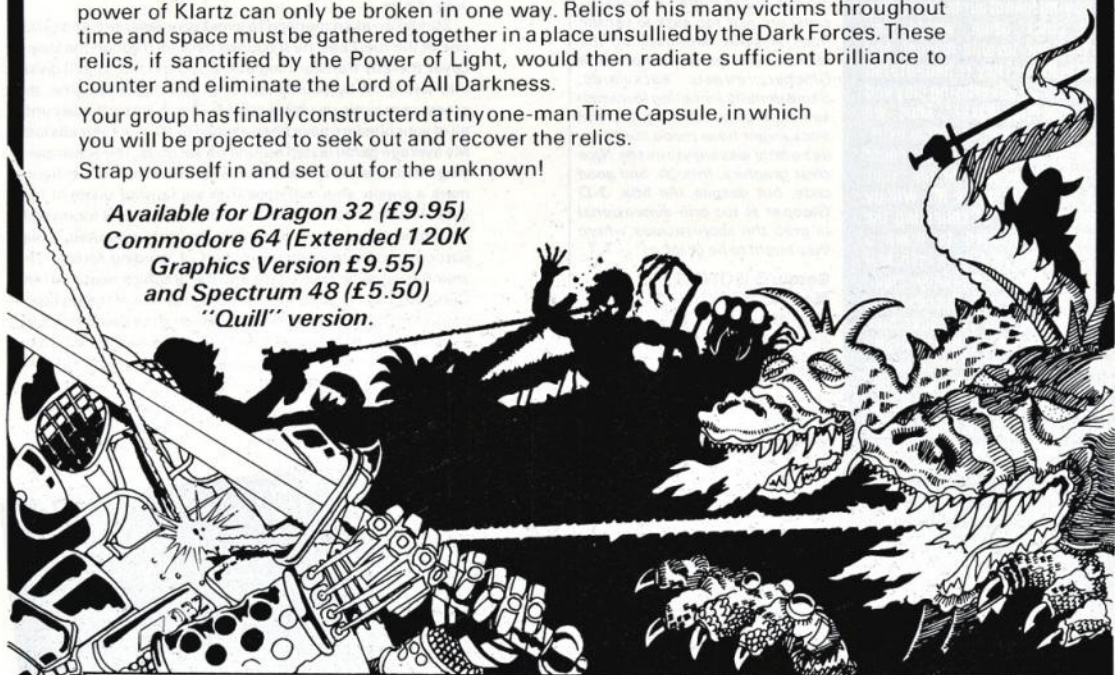
Legends tell of Klartz prowling the vast, empty reaches of space, sliding through the barriers of time at will. Descending, like the hideous parody of a Greek God, into some unsuspecting era of times past or futures to come, he would blend into the background while setting in train the most hideous acts of destruction.

You are a member of a small group of survivors dedicated to The Plan, to rid the Universe of Klartz and his Dark Forces. From the century-long study of The Plan library of timescans, it is clear that the power of Klartz can only be broken in one way. Relics of his many victims throughout time and space must be gathered together in a place unsullied by the Dark Forces. These relics, if sanctified by the Power of Light, would then radiate sufficient brilliance to counter and eliminate the Lord of All Darkness.

Your group has finally constructed a tiny one-man Time Capsule, in which you will be projected to seek out and recover the relics.

Strap yourself in and set out for the unknown!

*Available for Dragon 32 (£9.95)
Commodore 64 (Extended 120K
Graphics Version £9.55)
and Spectrum 48 (£5.50)
"Quill" version.*



P.O. Box 4, Ashbourne, Derbyshire, DE6 1AQ. Tel: (0335) 42529



K = Could Be Better
KK = Could Be Worse
KKK = Unsurpassable

Not quite your Hampton Court

Ever had a nightmare about being pursued down a brick-lined maze, with no way out and THINGS — nasty, huge, shapeless THINGS, hungry THINGS — just around each and every corner? No? You haven't lived. Supersoft's **3-D Glooper** (Commodore 64) evokes this ancient terror with all the unreal speed of the worst nightmares.

In fact, it's another maze game — but this time from the inside out. That is, you ARE the dot-gobbler in person, and what you see, friend, is what you get.

Joystick reaction is very fast, almost too fast — it would have been nice to insert a half-scroll frame between looking, say, straight ahead and the view to left, right or behind. As it is, you whirl like a dervish as you pursue the green dots on the pavement (who left THOSE there?) to infinity, never knowing when the Gloopers — big, furry blobs, quite lovable actually — are going to loom up and devour you. You are aided in the avoidance of same by a rather hard-to-follow radar screen; but my real complaint is that these cuddly-toy monsters (clones of the Dralon jobs that inhabit Sugar Puffs TV commercials) are just too easy to escape from. A swift haul-back on the stick and you retreat — that is, the Glooper...retreats: backwards. Some penalty for failing to munch sufficient green dots against the clock might have made the beasties a little less easy to evade. Nice clear graphics, though, and good code, but despite the title, **3-D Glooper** is too one-dimensional to grab the sophisticates where they ought to be grabbed. — T.T.

Game: 3-D GLOOPER
Maker: SUPERSOFT
Machine: COMMODORE 64
Format: cassette
Price: £5.95
Rating: KK



PASS THE SAUCE

You can just imagine it, can't you: "Hello. Ocean Software? This is Wimpy International. We think too many people are staying at home playing with their micros and not out buying tons of our burgers. Run off a quick game, would you, starring our lovable mascot, and sell it to them. They're bound to fall for our subtle advertising ploy and come flooding back!" Thus we have **Mr Wimpy**, an eating experience over two screens that could put you off burgers for life. Your first task is to guide Mr Wimpy through the job of collecting the ingredients needed to make a burger, frustrated by a maniacal blob called Waldo who keeps stealing them from you. Successfully evade Waldo and you move onto screen two which is, naturally enough, a version of the **Burger Time** arcade game. Mr W dashes up and down ladders and across buns, meat, lettuce, etc., which drop down to make up complete burgers below. Antagonists in this section are Sid Sos, Pam Pickle and friends. Screen two makes a great game on its own and should have been accessed directly rather than having to go through the lacklustre screen one. Other features include: Joystick options, demo mode, high score and bonus time score. Machine code graphics are smooth and very good, sound is fine also. There are eight levels of difficulty in all. I think I'd prefer a double cheeseburger and a bag of soggy chips. — R.B.

Game: MR WIMPY
Maker: OCEAN SOFTWARE
Machine: SPECTRUM 48K
Format: cassette
Price: £5.90
Rating: KK



FUEL — WHAT A SCORCHER!

A compellingly original space fest that's probably easier to play than describe. Your starbase is under attack and evil Colonial forces are intent on your fuel cells. One by one (or three by three depending on which level you reach) they descend, accompanied by showers of Death Particles — which needless to say have to be avoided. What's worse, a Colonial Death Layer follows hot on their heels — if Colonial forces do indeed have heels — which rapidly cuts down your area of play.

Should an alien manage to avoid your laser fire and reach one of the fuel cells, he'll bounce back up through the Death Layer thereby transforming into a Superclone, who'll divide into two if hit by your blaster. As you might imagine, the pressure mounts up rather quickly. The thing continues until all of your blasters have been zapped or all your fuel cells lost. My average game lasted around 55 seconds. The accompanying manual tells me that should your score top the five-figure mark a supply ship will appear to top up your quota of fuel cells. I'll take that as read as I'm unlikely to see it for myself!

Cosmic Clones is a nice idea, stylishly executed. I was particularly taken with the notion of dividing forces. The sound is suitably discordant and the graphics neat and tidy. Curiously I had to abandon joysticks in favour of the keyboard as I found them far too sensitive. Avoiding the Death Particles calls for precise movement and the sticks had me whizzing around the lower portion of the screen like some gun-toting ice skater. Most undignified. — S.K.

Game: COSMIC CLONES
Maker: DRAGON DATA
Machine: DRAGON 32

Format: cassette
Price: £7.95
Rating: KKK

Space Invaders has become, over the years, not so much an old favourite as an old chestnut. So you've got to have a pretty brilliant version if you still want to cut any ice. An indifferent adaptation like this is of no interest to anyone. There are three skill levels: 'Rookie', 'Master' and 'Expert' — but only the latter offers any sort of acceptable speed and even then you could sit playing it for hours. The unstoppable menace which made the original such a hit has gone to lunch and there's nothing in its place. Only the sound, namely a hesitant rendition of the *Star Wars* march is vaguely commendable. Spend the cash on something else. — S.K.

Game: SPACE RAIDERS
Maker: MICRODEAL
Machine: DRAGON 32

Format: cassette
Price: £8.00
Rating: None

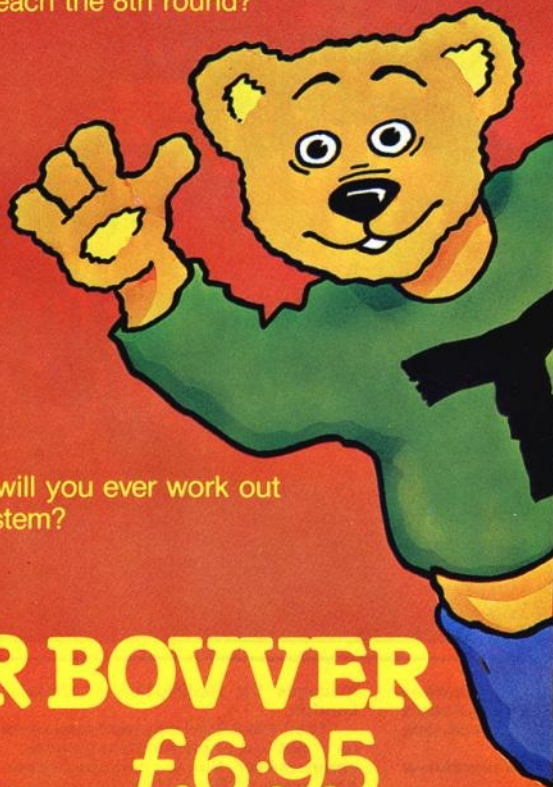
It's no picnic!

But if you go down to the woods today, will you help Ted get his batteries?

Or will you get bowvered?

Or get the cocktail?

Will you ever reach the 8th round?

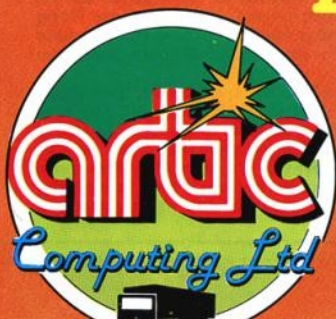


Come to that, will you ever work out the scoring system?

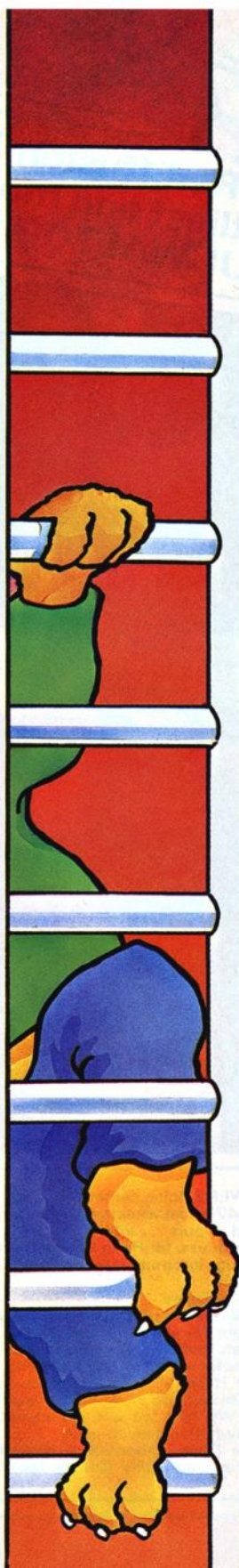
BEAR BOVVER

£6.95

(Spectrum 48K)



Available from:-
Artic Computing Ltd.
Main Street,
Brandesburton
Driffield
YO25 8RG
Tel: 0401 43553





The Rediffusion 747 F.Sim is the world's largest, costliest and most realistic computer game. PAUL WALTON flew it anyway.



ROMEO FOXTROT,
BREAK LEFT... TOO

WE WERE doing something in the order of 500 knots as our 747's nosewheel sank into the tarmac of Hong Kong's island airport . . . which was bad news for us, and, one might guess, for Hong Kong airport.

A huge lurch and a terrific thump — that was all we knew about it.

Then silence.

Then we got up and walked away.

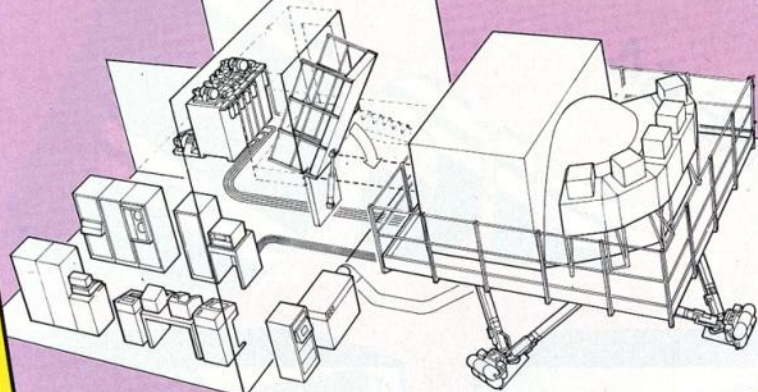
Flight Simulation (F. Sim to those in the know) stretches realism to the humanly acceptable limits. Sophisticated computer systems coupled with advanced hydraulics make it possible to reproduce almost any sensation. "We're working on the smoke and flames, too, as you can see. We feel we can do everything else," said my somewhat-shaken co-pilot.

Jim Dann, otherwise a modest and witty systems engineer, can play God at the F. Sim installation he

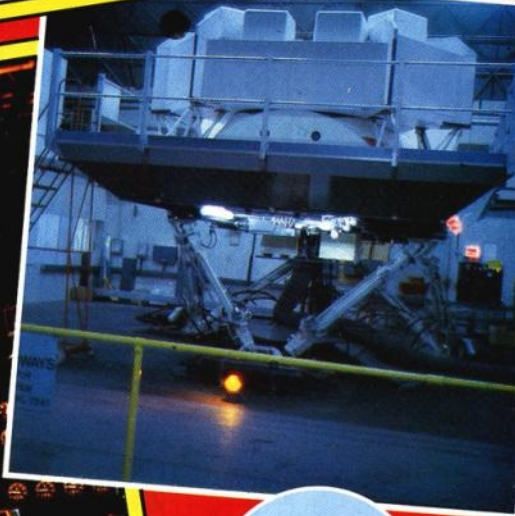
manages for Rediffusion in Crawley, just south of London.

"I don't feel Atari represents any serious competition to us — not just at the moment anyway." — I had dared to compare his F. Sim to a computer game. True, a catastrophic crash in River Raid was never so realistic as the demise of that (thankfully unreal) 747 flight into Hong Kong. But how long will it really be before this ultimate video game is open to the public? Sooner than you think . . .

Last month saw Rediffusion unveiling its first space shuttle. More precisely, it was showing off the first commercial simulator craft capable of transporting forty to sixty people through any experience they might care to want or ever be able to afford. We were therefore more than delighted to be given an exclusive tour around the plant and actually inside some of the most advanced



Line drawing of Rediffusion's Flight Simulator. Enormously powerful hydraulics tilt and roll the cabin in any axis, so adding realism to the trainee's experience and testing his responses to emergency procedures. Heavy landings can even be bad for your back!



Left: a night landing, properly done. Touchdown is seconds away. Above: The Beast inside its purpose-built hanger. Ten million bucks'-worth of heavy metal.

simulators which will be bringing these giant experience-games to a wider audience.

WAR OF THE WORLDS

CORDONED OFF in a hundred square yards of factory floor — for our protection! — the 747 simulator we were to "fly" looked harmless enough until it began quite literally to take off. That is, it tilted and went upwards. A 747 passing through (simulated) turbulence must be very close to H. G. Wells' version of long-legged Martian monsters on the rampage.

The simulator's real-time "motion" is supplied by six sets of immensely powerful yet very sensitive pistons. These "super enhanced bulldozer jacks" carry an entire 747 flight cabin four or five feet into the air, shaking the 3-tonne, lorry-sized load around like a rag doll.

Towering some thirty feet over our heads, the 747's nose cone first reared up for a few seconds; then it stopped dead; and then the entire cabin tipped sharply over to the left away from us, stopping just as suddenly to hold the attitude.

"They've just taken off and made a pretty long bank to their left, probably to avoid the mountains on the way out of Hong Kong airport. They'll now be cruising at about 550 knots out over the South China Sea," explained Jim Dann — a man who obviously relishes the illusions his simulators can create and rejoices in their effect.

INSIDE THE BEAST

YOU KNOW when you're inside a 747 flight cabin. Distinctive sights and sounds assail the senses. These environmental changes easily fool gullible grey matter —

Continued on page 53

for the
COMMODORE 64



GAMES PEOPLE PLAY



MEGAHAWK

Fly the sensational MEGAHAWK through the Abyss of Time as fearful bats and ice age predators seek your destruction. Be amazed as the 4th dimension unfolds itself with awesome reality. Stretch your skill to the limit as you leave the time corridor into a new universe.



ZYLOGON

Seek out and destroy the Android Space Platform that threatens Mankind. Break down the defense of the ZYLOGONS whose huge fortresses guard wave after wave of relentless attackers. Fast and furious Full colour Isometric Projection Machine Code; Val Franco

£6.95 inc. postage
each

DEALER ENQUIRIES WELCOME

Post this coupon to : **BIG G**

Birchall Moss Hall, Hatherton, Nantwich, Cheshire, U.K.
tel. 0270 811948 telex. 367311 CW5 7PJ

Please Rush me :-

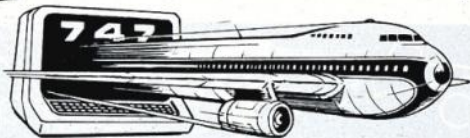
- ☐ **MEGAHAWK** £6.95 inc VAT
☐ **ZYLOGON** £6.95 inc VAT

Name _____

Address _____

_____ Post Code _____

I enclose cheque/postal order payable to 'BIG G'
for £ _ _ _



they can even fool the strongest stomach into airsickness.

Having climbed up the ladder and clambered into the 'driving seat', an intelligent human being ought to remember that it's just a hyper-realistic video game. Not so. This video game is played so realistically that, after only a few minutes, you're taking it as seriously as anything in your life before. It *is* real.

"Not like a VIC-20 is it?" smirks co-pilot Bob Soper. He has the job of maintaining Rediffusion F. Sims around the world.

While the mock-up 747 flight cabin is impressive — right down to small details like the oxygen masks and parachutes which we (hopefully) won't need — it is the view forwards out of the two main windows which most impresses. Take a look, though, at either extremity — and the simulated view disappears smoothly to leave a grey back-cloth at the very edge of the windows...

The next thing to notice is how the muted roar of the engines increases in volume and pitch as Soper turns them on, and how the airflow begins to whistle as we begin to "taxi" down the "runway". "Pre-recorded sound," says Soper, watching the throttles and gauges.

We are about to take off from Hong Kong airport at night and the sights are unbelievable — well, no, that's the point — they *are* believable. Customers can choose between day or night-time flying, but we can also select any one of the world's 47 most popular airports to "fly to".

The official term for this type of 3-dimensional aviation computer-model is Ground Station, but the pilots call them "plays". Bob Soper was keen to point out that while F. Sim is clever (it is actually sold under the rather unimaginative label SB, or Simulator Booth), it isn't used to train novices.

Even at £5,000,000 apiece, an aircraft simulator is a cheaper means of polishing pilots and cabin crew than the real thing — given the enormous costs involved in a single takeoff and landing. On this simulated 747, flight crew of any airline can gain valuable experience of all these major international airports without ever leaving the ground. So *this* video game makes money.

MY EYES, EARS AND STOMACH DECEIVE ME...

LOOKING DIRECTLY ahead you see a runway, illuminated exactly as it would be at night. On either side of us are the lights of Hong Kong, blocks of offices and flats. Thousands of them (what a lot of people!). These points of light disappear into the middle distance as the high-rises climb the steep mountains of Kowloon and the New Territories at the end of the runway.

We gather speed along the runway. The lights come towards us — and then flash past the edges of the windows. The grey/brown mass of the mountain grows rapidly to fill almost the entire window, the runway lights disappear and then...

Rotate!

We *could* fly straight through the "buildings" with only the slightest shudder, but collision with that mountain would most definitely bring on a "crash".

That strange thump which hits the pit of your stomach when taking off on a plane, not unlike swallowing a cannonball, is faithfully reproduced (how?). In the flight cabin all attention is focussed on the twin screens. The characteristic 'G' (or gravitational) forces "experienced" whilst flying are really just illusions. The simulator is really just lifting its nose in the air, or banking to left or right. It's not going anywhere.

Is it?

With my eyes on the runway, and the mountain ahead, we experience that sharp upward tilt of the aircraft with all the sensations of a real take-off. You "feel" the motion, your other senses register the ascent, and, to top it all, the aircraft then speaks to you! Shades of Maestro!

Every 747 has a limited — but useful — vocabulary of a

dozen or so phrases, along with sundry bleeps, whoo-ahs, farts and urghhs. Just seconds after take-off our own verbal accompaniment shouts: "Tilt Rate" some five times, makes various noises, shouts "Pull-up" with metallic urgency — and then lapses into a long recital of the rather nagging "Wide Slope" for what seems like minutes.

Bob Soper explains that these phrases tell the pilot only the most important details — those likely to result in some catastrophe!

What *else* does it know?

From the sublime to the... less sublime.

How much commercial software matches up to Rediffusion's Simulator? Microdeal's Air Traffic Controller is one contender. ANDY GREEN reviews...



MICRODEAL, a British company operating from St. Austell in Cornwall, have recently brought out an *Air Traffic Controller* game for several different micros, all claiming high resolution graphics and other exciting features.

Microdeal also market a similar program, *Space Shuttle Simulator*. Microdeal sell the program on tape or disc, and although I got the tape version for review it loaded with no errors first time. It's £2E blocks long.

After a pause, a little title screen comes up in Mode 5. I guess a title screen sets the trend for a whole game, really. It's one of those little things that doesn't add to the enjoyment of the game, but can give it a professional feel right from the start. Oh dear, Microdeal.

It was at this point that a sudden suspicion crept into my mind, but I immediately dismissed the idea. No, they wouldn't have written a game that relies almost solely on smooth, quick movement in... in BASIC — would they? Of course not.

The program then wanted to know if we were using the keyboard or the joysticks — a point in its favour — then moved on, after a five-second pause, to the main game frame. It was at this point that the awful truth reared its ugly head. Little two-triangle aeroplanes flicked slowly from pixel to pixel in black and white.

Pressing CTRL-BREAK and OLD revealed 10K of BASIC controlling events.

I for one expect to find a well written, adequate fast game in the box when I part with my money, like those of Acornsoft, Program Power and Superior Software, to mention only a few. Programs like *Killer Gorilla*, *Q*bert* and *Planetoids*, machine-coded and beautifully written, are really worth the money. Games such as this one you'd expect to see in the listings section of BIG K — after all, it is totally in BASIC!

To be fair, though, it also has 'landing' and 'take-off' screens, but these are in much the same vein as the first. You just alternate between the two screens until all of the five machines you started off with are crashed. A major fault in the program design is that these 'planes', weighing 'tons' each, have no inertia! They do 180 degree turns at massive speeds on a pinhead!

When all the planes under your control have finally done their Pope impersonations on the tarmac, you're treated with another badly-laid out high-score screen, and asked if you want another go. If you say no, the program prints up endless triangles in different colours (the programmer probably thought this would have 'em spellbound) until you hit 'escape'.

In conclusion, if this is the state of the art in BBC flight simulator-type games, then forget it for now. Alas. Although it seems like a good idea, the implementation of this particular product has not come off very well.

Solar SOFTWARE

51 Meadowcroft, Radcliffe,
Manchester, M26 0JP
Tel: 061 724 8622

Quality arcade action games for the **COMMODORE 64**

GALAXIONS The earth is being invaded by an alien force, the GALAXIONS have arrived from a dying planet, determined to destroy civilization as we know it. They came in formation, swooping and diving towards the planet earth. You and you alone can save mankind from the terrifying destruction the aliens threaten us with.

100% Machine Code

3 Lives

Bonus ship at 10000

Progressive levels of play



£7.95

munch man 64 A fantastic version of this popular arcade game.

100% Machine Code

3 Lives, Bonus fruit

Power pills

4 Very intelligent ghosts



£7.95

Robin to the Rescue In days of old when knights were bold and the sheriff was in power, to play this game guide Robin Hood, to Marian locked up in the tower.

100% Machine Code

Sprite Graphics

3 Lives

12 Screens of arcade action



£7.95

All our games are available mail order P&P included from the above address. Orders sent by return post. Also available from all good computer shops.

Distribution,
P.C.S. Darwen, CENTRE SOFT West Midlands
ALPHA TAPES, Merseyside, TIGER, Cheshire,
LIGHTNING, London,
LEISURESOFT, Northampton.

GAMESTERS

THE BEST DEALS AROUND!!

Just compare our prices

VIC 20		SPECTRUM		COLECOVISION		COMMODORE 64	
Arcadia by Imagine	£4.39	Nightlife by Hewson	£5.14	Zaxxon	£26.30	Horace Goes Skiing by Melbourne	£5.14
Mission Mercury by Virgin	£7.42	Shuttle by Blobby	£5.14	Smurf	£22.00	Bilmanio by Virgin	£6.66
		Transylvania Tower by R. Shepherd	£5.19	Turbo including Turbocharger	£44.00		
		Lost (48K) by Virgin	£5.89				

ATARI VCS		DRAGON	
Donkey Kong	£22.00	Death Cruise by Virgin	£5.79
Beam Rider	£19.00	Keys of Roth by Computer Rentals	£5.23
Tropical Trouble	£22.00		
Mission X	£21.00		
Advanced Dungeons & Dragons with Cloudy Mountain	£21.00		

And these are just a few of the thousands we have in stock

Send cash/cheque/P.O. with order.
(Remember to tell us what machine you own).
Or 'phone-in your Access/Visa card number on 01-206 0665, for immediate despatch (maximum 28 days).

GAMESTERS — HORTON CARLYLE LTD, ROOM 4D, MASONS HOUSE, 1-3 VALLEY DRIVE, KINGSBURY, LONDON NW9 9NG.

CAN YOU SINK THE BRITISH AND SAVE THE ADMIRAL GRAF SPEE?



**TRY WITH TEMPTATIONS NEW "ADMIRAL
GRAF SPEE"** — 48K SPECTRUM **£5.95**
— COMMODORE 64 **£7.95**

AVAILABLE FROM LARGER BRANCHES

OF  LEADING SOFTWARE

SUPPLIERS OR DIRECT FROM

ADDRESS BELOW.

Temptations
SOFTWARE

27 Cinque Ports Street, Rye, East Sussex Tel: Rye (0797) 223642

HOW TO MAKE A RED DEVIL SEE RED

with accurate control from Suncom



Beating the game requires positive response and fast accurate control.

That's why beating the game requires Suncom from Consumer Electronics.

A range of 3 quality joysticks all with arcade-style features plus Joy Sensor, the ultimate, with precision, touch-sensitive control.

No stick to move, no resistance to movement.

Together with a range of C.E.L. Adaptor leads, they're compatible to a wide range of machines.

Check them out at your dealer—they're sure fire winners.

For details of your nearest stockist contact—Consumer Electronics Limited, Failsworth, Manchester M35 0HS. Tel: 061-682 2339.

Compatible with

Atari CX2600 Game System*
Atari Personal Computer Systems*
Commodore 64 & Vic 20 Computers*

An adaptor (sold separately) is available for
Texas Instruments TI 99/4A Computer*
Adaptor Model No. 11060

*These are the registered Trade Marks of the individual companies concerned.

 **Suncom**
from Consumer Electronics.



You are at the wheel of a turbodriven sports racing car, pouring on the horsepower and wrestling with the curves as you aim for the maximum distance to cover around the track inside two minutes flat. Hazards lurk, and the racetrack is full of unpleasant surprises. Can you beat all previous high scores and earn yourself the proud title of...

By TROGLODYTE

DEMON DRIVER

```
10 REM DEMON DRIVER
20 REM WRITTEN BY MARK & FRANCES (MJA &
FMA 4E4)
30 REM INITIALISE HIGH SCORE
40 LET H=10:LET A$="TROGLODYTE"
50 CLS
60 PRINT@234,"DEMON-DRIVER"
70 PRINT@297,"(C) TROGLODYTE"
80 FOR N=1 TO 500:NEXT N
90 FOR N=1 TO 300:SCREEN0,0:SCREEN
0,1:NEXT N
100 FOR N=1 TO 1000:NEXT N
110 CLS
120 PRINT:PRINT" THE OBJECT OF THIS GAME
IS TO CONTROL YOUR CAR, A ... ALONG THE
ROAD, TRAVELLING AS FAR AS POSSIBLE
WITHIN THE TIME LIMIT OF TWO MINUTES."
130 PRINT:PRINT" control IS BY
THE right-HAND", "JOYSTICK. YOU CAN CONTROL
YOUR", "LATERAL POSITION BY MOVING
THE", "JOYSTICK LEFT AND RIGHT, AND YOUR
SPEED BY PRESSING THE fire", "BUTTON. IF
YOU PRESS THIS BUTTON, YOU WILL TRAVEL
FASTER."
140 LET B$=INKEY$
150 PRINT"good luck",,,, "press any key
to continue";
160 SCREEN0,1
170 FOR N=1 TO 500
210 IF INKEY$<>" " THEN 230 ELSE NEXT N
220 GOTO 160
230 CLS
240 INPUT "ROAD WIDTH (3_9)";W
250 IF W<3 OR W>9 OR W<>INT(W) THEN 230
260 PRINT:PRINT"HOW FAR DO YOU WANT TO
SEE?"
270 PRINT" (5_15)"
280 INPUT F
290 IF F<5 OR F>15 OR F<>INT(F) THEN 270
300 LET F=16-F
310 D=0
320 G=16-W/2
330 LET X=1023+G+F*32+W/2
340 REM DRAW START OF ROAD
350 CLS
360 FOR N=F TO 15
370
PRINT@ (N*32+G),STRING$(W,CHR$(191));380
LET A=RND(3)-2
390 IF G+A<1 OR A+G>30 THEN 410
400 LET G=G+A
410 NEXT N
420 POKE X,35
430 REM WAIT FOR PLAYER TO PRESS FIRE
```

```
BUTTON
440 FOR N=0 TO 15
450 READ B$
460 PRINT@ (N*32),B$;
470 NEXT N
480 DATA p,u,s,h, ,f,i,r,e,,b,u,t,t,o,
n
490 IF PEEK(65280)<>126 AND PEEK(65280)
<>254 THEN 490
500 RESTORE
510 FOR N=0 TO 15: PRINT@ (N*32),"";:NE
XT N
520 FOR N=0 TO 9:PRINT@ (N*32),RIGHT$(ST
R$(N),1);:NEXT
530 FOR N=9 TO 0 STEP -1:PRINT@ (N*32),"
*";:SOUND 255/(N+9),1:PRINT@ (N*32),"";
:NEXT N
540 REM START TIMER
550 TIMER=0
560 REM START OF LOOP
570 POKE X,35
580 IF JOYSTK(0)>48 THEN X=X+1
590 IF JOYSTK(0),16 THEN X=X-1
600 IF PEEK(65280)=126
OR PEEK(65280)=254 THEN POKE 65495,0 ELSE
POKE 65494,0
610 LET A=RND(5)-3
620 IF G+A<1 OR G+A+W>31 THEN 640
630 LET G=G+A
640 PRINT@ ((480+G),STRING$(W,CHR$(191)))
650 D=D+1
660 IF TIMER>6000 THEN 780
670 IF PEEK(X)=191 THEN 570
680 REM HIT OBSTACLE
690 IF PEEK(X)=96 THEN 700
700 REM CRASHED,PEEK(X)=96
710 FOR N=1 TO 100: SCREEN0,0:SCREEN0,1
:NEXT N
720 SOUND 1,4
30 FOR N=1 TO 20:POKE X,153: POKE X,185
:POKE X,150: POKE X,182:NEXT N
740 POKE X,159
750 FOR N=1 TO 500:NEXT N
760 CLS
770 GOTO 970
780 REM COURSE COMPLETED
790 LET C$="congratulations"
800 CLS0
810 FOR N=1 TO 7
820 PLAY "T7V1004B"
830 PRINT@ (231+N),MID$(C$,N,1);
840 PLAY "G"
850 PRINT@ (247-N),MID$(C$,16-N,1);
860 NEXT N
```


It's no big deal,
really... just an
alien UFO on its
way to level your
city. You only
have one tank with
AA capability to
defend your urban
airspace, so for
once you can blaze
away in a good
cause. Get blazing!



SAVE

PROGRAM: TANKY

```
5 OF=30720:VA=9*1613+14:VN=VA-1
8 POKE VA+1,190
9 PRINT"BLACK,CLEAR,DOWN28,RVOFF]
  (LEFT,INST]
[HOME]"
20 PRINT"[HOME,RVS]** TANK VERSUS UFO
  **"
21 PRINT"[HOME,DOWN,RVS]
  USE JOYSTICK TO MOVE "
100 PRINT"[HOME,DOWN18]"
101 FOR A=38400 TO 38400+22*23
  :POKE A,0:NEXT A=0
105 PRINT"|"
110 PRINT" _[RVS] [RVFF]_"
115 PRINT"00000"
120 PRINT"[UP3]"
125 GOSUB 8000: IF JO AND 16 THEN GOS
  UB 300:A=A+2:GOTO 220
130 IF JO AND 4 THEN GOSUB 300:A=A-2
  :GOTO 220
135 IF(JO AND 9)AND B=0 THEN B=1
  :C=8079+A:P=15:L=1:POKE VN,156
  :POKE C,160:POKE C+OF,4:GOTO 170
136 IF L=0 THEN 140
137 POKE VA,P:P=P-1:IF P=-1 THEN L=0
  :POKE VN,0
140 IF B=0 THEN 170
141 FOR H=1 TO 3:POKE C,32:C=C-22
150 IF PEEK(C)=60 OR PEEK(C)=42 OR PE
  EK(C)=62 THEN 600
155 IF C<7746 THEN B=0:GOTO 170
160 POKE C,46
161 NEXT
170 IF D=0 THEN 800
172 IF D=0 THEN 180
173 IF EC7682+110 THEN POKE E-2,32
  :POKE E,32:POKE E-1,32:GOTO 800
174 POKE E,32:POKE E-1,32:POKE E-2,32
  :K=K+1
176 IF E=1 THEN D=0:GOTO 180
178 E=E+J:POKE E,62:POKE E-1,42
  :POKE E-2,60
179 IF J=1 THEN 182
180 IF INT((8186-E)/22)=22-K-A AND F=
  0 THEN F=1:G=E+21:M=21:GOTO 133
181 GOTO 183
```

```
182 IF INT((8098-E)/22)=A-K AND F=0 T
  HEN F=1:G=E+23:M=23
183 IF F=0 THEN 125
184 POKE G,32:G=G+M
186 IF PEEK(G)>32 THEN 700
187 IF G>7680+22*21 THEN F=0:GOTO 500
189 POKE G,81:GOTO 125
220 IF A=0 THEN A=0
221 IF A>15 THEN A=15
222 PRINT TAB(A)"|"
225 PRINT TAB(A)" _[RVS] [RVFF]_"
230 PRINT TAB(A)"00000"
235 PRINT"[UP3]":GOTO 135
300 PRINT TAB(A)"|"
305 PRINT TAB(A)"|"
310 PRINT TAB(A)"|"
315 PRINT"[UP3]":RETURN
500 POKE G,66:POKE G+1,78:POKE G-1,77
  :POKE G-20,46:POKE G-21,46
  :POKE G-22,46
510 POKE G-23,46:POKE G-24,46
520 FOR AA=1 TO 100:NEXT
530 POKE G,32:POKE G+1,32:POKE G-1,32
  :POKE G-20,32:POKE G-21,32
  :POKE G-22,32
540 POKE G-23,32:POKE G-24,32
590 GOTO 125
600 POKE C,160:POKE C+1,160
  :POKE C-1,160:POKE C+22,160
  :POKE C-22,160
601 L=0
610 POKE VN,128+100
611 FOR GG=15 TO 0 STEP-1:POKE VA,GG
  :FOR GH=1 TO 70:NEXT NEXT
615 B=0:D=0
616 POKE C,32 :POKE C+1,32
  :POKE C-1,32 :POKE C+22,32
  :POKE C-22,32
517 POKE C-2,32:POKE C+2,32
  :POKE C-3,32:POKE C+3,32
540 E=E+22+J:POKE VA,15:POKE VN,0
545 POKE E,62:POKE E-1,42:POKE E-2,60
546 FOR O=248 TO 253:POKE VN-1,0 NEXT
  :FOR O=253 TO 248 STEP-1
  :POKE VN-1,0:NEXT
647 POKE E,32:POKE E-1,32:POKE E-2,32
550 IF EC7680+20*22 THEN 640
```

THE CITY!

by D. LATER and E. BLARE

ILLUSTRATION: DAVID HINE

FOR
COMMODORE
64



```
651 E=E+J
652 POKE E+22,62:POKE E+21,42
:POKE E+20,60:POKE E+0F,4
:POKE E+0F-1,4:POKE E+0F-2,4
653 POKE E+22+0F,0:POKE E+21+0F,0
:POKE E+20+0F,32
654 POKE VN-1,0:POKE VN,128
:FOR Q=1 TO 20:POKE VA,
15-INT(Q/1.33)
655 POKE E,223:POKE E-1,223
:POKE E-2,223:FOR Q=1 TO 20:NEXT
656 POKE E,233:POKE E-1,233
:POKE E-2,233:FOR Q=1 TO 20:NEXT
657 NEXT:POKE E,32:POKE E-1,32
:POKE E-2,32:POKE E+22,32
:POKE E+21,32:POKE E+20,32
658 PRINT "[YELLOW,HOME,DOWN2]"
659 DT=DT+1:GOSUB 900
660 GOTO 125
700 POKE VN,128:L=0
701 A=A+1:FOR KL=1 TO 20
:POKE VA,15-INT(KL/1.3):
704 PRINT TAB(A)"[RVS,MAGENTA]""
705 PRINT TAB(A)"[RVS]"
715 PRINT "[UP2]"
720 PRINT TAB(A)"[RVS,MAGENTA]""
725 PRINT TAB(A)"[RVS]"
```

```
735 PRINT "[UP2]";
740 NEXT
745 PRINT TAB(A)" "
750 PRINT TAB(A)" "
751 PRINT TAB(A-1)" [GREEN]"
752 PRINT "[UP3]";
756 PRINT "[YELLOW,HOME,DOWN3]"
757 DU=DU+1:GOSUB 900
760 F=0:A=0:GOTO 105
800 D=1:E=7702+INT(RND(1)*14)*22+88
:I=E-20:K=0:J=-1:IF RND(1)>.5 THEN
E=E-21:I=E+20
805 GOTO 172
900 PRINT MID$( "[BLACK,RED,CYAN,
MAGENTA,GREEN,BLUE,YELLOW]",
RND(1)*7+1,1);
910 PRINT "[RVS,HOME,DOWN2]JUF0
:E=20:[RVS]TANK:"DT
:PRINT "[DOWN15]"
920 RETURN
8000 REM READ JOYSTICK
8010 POKE 37154,127
8020 JO=(NOT(PEEK(37152)AND 128))/8+(
PEEK(37151)AND 60)/4)+32
8030 POKE 37154,255
8040 RETURN
```

Our record stores now come complete with Hunchbacks, Hobbits and Manic Miners.

Fleets of computer games have invaded your local
HMV shop. This is just a selection of what you'll find.
So get here now and prepare for battle.

ZX SPECTRUM

Atic Attack (Ultimate) 5.50
Fighter Pilot (Digital) 7.95
Manic Miner (Software Projects) 5.95
Hunchback (Ocean) 6.90
Fred (Quicksilver) 6.95
3-D Ant Attack (Quicksilver) 6.95
Hall of the Things (Crystal) 7.50
Birds and Bees (Bug Byte) 6.95
Pinball Wizard (CP Software) 5.95
Bear Bover (Artic) 6.95
Football Manager (Addictive Games) 6.95
Lords of Time (Level 9) 9.90
The Hobbit (Melbourne House) 14.95
Classic Adventure (Melbourne House) 6.95
Snooker (Artic) 5.95
Bridge Player (CP Software) 8.95
Dragonsbane (Quicksilver) 6.95
The Quill (Gilsoft) 14.95
Primary Arithmetic (Rose) 5.95
French Mistress (Kosmos) 9.95
O-Level Chemistry (Calpac) 7.50

COMMODORE 64

Scuba Dive (Martech) 6.95
Rollerball (Ocean) 6.90
Panic (Interceptor) 7.00
Siren City (Interceptor) 7.00
Hustler (Bubblebus) 6.99
Mothership (Artic) 7.95
Snowball (Level 9) 9.90
Ultisynth (Quicksilver) 14.95
Word Power (Sulis) 9.95
VIC 20
Wizard and Princess (Melbourne House) 5.95
Jet Pack (Ultimate) 5.50
Laser Zone (Llamasoft) 6.00
Bewitched (Imagine) 5.50

Not available in: Bedford, Edinburgh, Enfield, Gloucester, Leicester,
Lewisham, Nottingham, Portsmouth and Sunderland.

Space Joust (Software Projects) 5.95
ORIC I
Zorgon's Revenge (IJK) 8.50
Island of Death (Ocean) 6.90
Mr Wimpy (Ocean) 6.90
Dracula's Revenge (Softek) 6.95
Harrier Attack (Martech) 6.95
Colossal Adventure (Level 9) 9.90
BBC
Hunchback (Superior Software) 7.95
Gorf (Doctor Soft) 7.95
Q-man (MRM) 5.90
Twin Kingdom Valley (Bug Byte) 9.50
3-D Bomb Alley (Software Invasion) 7.95
Missile Control (Gemini) 9.95
German Master (Kosmos) 9.95
Just A Mot (Sulis) 9.95
DRAGON 32
Maurice Minor (J Morrison Micros) 6.95
Ugh (Softek) 8.95
Transylvanian Tower (Richard Shepherd) 6.50
Up Periscope (Beyond Software) 6.95
ELECTRON
Kamikaze (A & F Software) 7.90
Cylon Attack (A & F Software) 7.90
Twin Kingdom Valley (Bug Byte) 9.50



LIFT OFF with



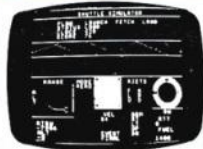
SPACE SHUTTLE



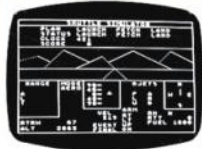
SPECTRUM LAUNCH STAGE



DRAGON 32 ARM STAGE



BBC FINAL STAGE



ATARI FINAL STAGE

MISSION BRIEF

Successfully pilot the Shuttle through Launch, Fetch & Finals. Take off and position Shuttle in orbit. Manoeuvre alongside malfunctioning Satellite. Retrieve - then re-enter to glide without fuel to White Sands Desert.

PREVIOUS SUCCESSFUL MISSIONS

EXCELLENT - "Personal Computer News"
A WELL THOUGHT OUT GAME - "Dragon User"
ALMOST WORTH BUYING A DRAGON FOR -
"Which Micro"

MISSION STATUS

Available for
48K ORIC 1, ATARI 16K, DRAGON 32, BBC
MODEL B, SPECTRUM 48K, COMMODORE 64,
ACORN ELECTRON, TANDY COLOUR 32K
CASSETTE £8 DISK £10

Postal Orders to
41 Truro Road, St. Austell, Cornwall PL25 5JE
Telephone/Credit Card Order
Tel: 0726 3456



MICRODEAL

Available from computer dealers
nationwide or from larger branches of



John Menzies

WIN A COLECO

...IN OUR SNAZZY, TOTALLY
FREE-TO-ENTER COMP

RULES

There is no entry fee but all entries must be on a proper printed coupon cut from BIG K and must bear the entrant's own name, age and address.

Every accepted entry will be examined and the First Prizes awarded to the two entrants who, in the opinion of the judges, have shown the most skill and judgment in placing the listed factors in the order of appeal to an average home user. Remaining prizes will be awarded for the next best entries in order of merit. No entrant may win more than one award.

In the event of a tie for ties for any prize(s) then a further test of skill will be conducted by post between tying competitors to determine the eventual winner(s) or winning order.

All prizes must be accepted as offered. There can be no alternative awards, cash or otherwise. If any winner is aged under 18 then parental consent must be provided before the prize can be awarded.

Any entry received after the closing date will be disqualified as will any received mutilated, illegible, altered, incomplete or not complying with the rules and instructions exactly. No responsibility can be accepted for entries lost or delayed in the post or elsewhere. Proof of posting will not be accepted as proof of receipt.

The judges' decision and that of the Editor in all other matters affecting the competition will be final and legally binding. No correspondence can be entered into.

The competition is open to all readers in Great Britain, Northern Ireland, Eire, the Channel Islands and Isle of Man except employees (and their families) of IPC Magazines Ltd., the printers of BIG K or of CBS Colecovision and their publicity agents.

All winners will be notified and the result published later in BIG K.

We're giving away ColecoVision Module 3's this month — two of them, to be precise. Each with 80K RAM, a daisywheel printer and a classy detachable Vision Video Game System to go with it, we're giving away two of those as well — with a third as a super 2nd Prize! Plus a Module 1 Atari Converter!

HOW TO ENTER

We have listed eight features of the Coleco Module 3 computer, all factors which help make this computer such good value for money. What we want you to do for this competition is place them in the order you consider they most appeal to the average home user.

Write the key letters of the eight factors — in ink — in the spaces on the entry coupon. For example, if you think that "detachable keyboard" would be the most appealing then put "D" in the first space. The letter of your next choice goes in the second space, and so on for all eight.

Complete the coupon with your name, age and address and then post your entry to: BIG K COLECO COMPETITION, 55 EWER STREET, LONDON SE9 6YP to arrive by the closing date which is Monday 30th April, 1984.

HERE ARE THE FACTORS

- A. large existing software library
- B. outstanding graphics and sound
- C. daisy-wheel printer as standard
- D. detachable keyboard for easy use
- E. large memory — 80K RAM
- J. built-in word-processor
- K. expansion possibilities — networking, extra memory
- L. high volume data storage — microfloppy drive



BIG K COLECO COMPETITION

1	2	3	4	5	6	7	8

In entering this competition, I agree to abide by the rules and to accept the published result as final and legally binding.

NAME AGE

ADDRESS

.....

.....

PLEASE CUT NEATLY AROUND THIS LINE

JUST SOME
OF THE
FEATURES
IN NEXT
MONTH'S
FREE GIFT
ISSUE OF...



MODULE 3

COM
• COMPETITION • COMPETITION • COMPETITION



The ColecoVision Module 3 is one peripheral that's about three times as big as its master component! Plugged into the Expansion Port of the Coleco Game System it brings you an instant 80K, plus a SmartWriter daisywheel printer, data storage and a sculptured detachable keyboard. Plus a built-in word processor! It uses a Z80A CPU, has six function keys and a numeric keypad. Best of all, you have instant access to any of CBS-Coleco's superb arcade-quality games, plus the pending range of ADAM software.

The ColecoVision Video Game System plus Module 1 Atari Converter combines the world's best games machine with the world's largest cart library. Bring true arcade power — dazzling graphics, brilliant sound — into your home!

SECOND PRIZE

is a superb ColecoVision Video Game System — giving you access to genuine arcade-quality games software.



THE CLASS OF '84: *There's never been more micros to drool over — and this year a whole new slew have invaded the stores. We line 'em up and check if their boots are clean.*

THE BRIT WHO BEAT SILICON VALLEY: *Yes, it can be done — selling home-grown progs to a US major, that is. We meet a Likely Lad who's done it.*

ADVENTURE SPECIAL: *Be a Dwarf! Oh, you are already? Then ... be an Elf!*

PLACE YOUR ORDER NOW. BIG K Computer Culture for Connoisseurs.

fantasy

SOFTWARE

Bob Hamilton's best selling Spectrum game has been beautifully converted for the Commodore 64 by John White with many additional features fully utilising the extra capabilities of this machine. The Pyramid contains 120 chambers on 15 levels. In order to get from one chamber to another you must fight off the indigenous aliens to collect an energised crystal which will neutralize the force field guarding the two exits. The Pyramid is defended by a total of 120 different beautifully animated aliens (more than any other video game in history!), one for every chamber and each with a unique attack pattern. They manifest themselves in the most amazingly diverse and peculiar forms from the squirting soda syphons to the extra-terrestrial tweezers and a whole host of entities defying rational description. You will have great fun inventing your own nicknames.

You proceed to explore the Pyramid from top to bottom with the difficulty increasing with the depth of level as the attack patterns get more complex and the aliens become intelligent.

Depending on the choice of exit from each chamber you are likely to have a different game every time you play.

Apart from the challenge of trying to achieve the highest score possible the Pyramid contains a number puzzle to solve. The more chambers you successfully visit the more information is gathered to enable you to unravel the secret numbers of the Pyramid.



This is "ZIGGY". He is shown above in his exploratory capsule and is a true representation of the on screen graphics. You have total control over his movements as you explore the many chambers of "THE PYRAMID".

THE PYRAMID

For
**Commodore
64**
and 48K
Spectrum

FANTASY SOFTWARE is available from W.H. SMITHS, JOHN MENZIES, BOOTS, LASKYS, GREENS, RUMBELOWS, SPECTRUM GROUP and all other good software retailers.

The Pyramid at £6.50 for Commodore 64K and at £5.50 for the Spectrum 48K from

FANTASY SOFTWARE, FAUCONBERG LODGE, 27A ST GEORGES ROAD, CHELTENHAM, GLOS GL50 3DT
despatched by return first class post together with free membership and current newsletter of the Fantasy Micro Club.

Trade enquiries welcome — telephone 0242-583661.

fantasy

SOFTWARE

DOOMSDAY CASTLE

is an arcade style game
with the feel
of a real adventure

Doomsday Castle consists of a labyrinth of 76 complexly inter-connected Halls and Passages where you will meet a whole host of adversaries serving the infinitely evil Scarthax, the Garthrogs, the Orphacs, the phenomenally nasty Googly Bird and the Urks which manifest themselves in over fifty unbelievably weird and wonderful guises.

Scarthax has scoured the Universe to bring together the six ancient stones of life force. United in Doomsday Castle they are being used to wield an irresistible power over the cosmos, emanating waves of corruption through every galaxy.

To save the Universe, you must battle your way through the Castle to find and collect the six stones and use their force against Scarthax to destroy Doomsday Castle, hopefully escaping yourself before the final cataclysmic explosion. The task is not easy (saving the Universe never is!) and it will take you many games to unfold the structure of Doomsday Castle and discover the locations of the ancient stones. The addictive arcade style action will keep you coming back to play but the overall challenge should still keep you occupied for months.

FANTASY SOFTWARE

is available from

W.H.SMITHS, JOHN MENZIES,
LASKYS, GREENS, RUMBELOWS,
SPECTRUM GROUP,
COMPUTERS FOR ALL and all other
good software retailers.

For 48K
Spectrum

DOOMSDAY CASTLE

is available at £6.50 from

FANTASY SOFTWARE, FALCONBERG LODGE, 27A ST GEORGES ROAD, CHELTENHAM, GLOS GL50 3DT
despatched by return first class post together with free membership and current newsletter of the Fantasy Micro Club.
Trade Enquiries welcome — telephone 0242-583661.

Computer Crime is on the increase. Illegal hackers' activities range from harmless japes to royal rip-offs involving megaquantities of green and folding — and worse. JOHN MAY has been keeping tabs on the doings of the electronic muggers.

WHEN THE ACCESS IS A LITTLE TOO RANDOM

They call themselves freakers or pranksters. Their favourite "calling card" is to instruct the computer to divide 0 by -1, a task so difficult the computer locks out every other user. Security consultants label their activities Juvenile Computer Delinquency.

Ten years ago they would have been using blue boxes to tap into the telephone system, making transatlantic calls for 2p from a phonebox. Now they're exploding the world's computer networks just to test their skills. No system is safe. Some of their activities have become legendary. It has been going on for many years and the problem is getting worse.

A classic example occurred in October 1974 when a 15-year-old schoolboy broke into the security system of a major London computer time-sharing service and gained access to the most secret files. His only tools were the school's teletype terminal — and his ingenuity.

By trial and error he discovered that he could read the main memory and he then wrote a program to provide him with a print-out of the operating system. Using this and an obsolete systems manual, he got a complete list of account numbers. By eavesdropping on users when they used the system, he was able to learn passwords and to gain access to their data files.

After his explorations, he wrote to the computer company telling them what he had done. They never replied.

Another computer company — Control Data — have skilled technicians working in groups known as "Tiger Teams", who test ways of gaining access to secure programs. The news is they almost always find some new way in.

"The element of game playing is an almost universal characteristic of computer crime."
International Management

Is education to blame? According to science correspondent Angus Macpherson: "Kids getting into computers to improve their recorded marks are so commonplace that some computer professors regularly fail all their students — those who are any good will get into the system and pass themselves."

At a West Germany university the situation developed to the point where it had become a game between departments to discover each other's passwords.

Most of this kind of activity is internal and low priority, with cases of students altering their marks by accessing archive files, or forming "crash clubs" to grainstorm their way into a Time Sharing service.

But in 1980 things went a little beyond that edge.

The location was the Dalton School on the East Coast, one of the most expensive (\$4,440 a year) and exclusive private day schools in America. From the school computer centre four students dialled into a computer network called Telenet and from there gained access to some 20 Canadian companies and universities, including a cement manufacturer in Montreal.

They then plugged into Pepsi's Master File Directory and located the program that contained the shipping instructions for the whole of Canada. A few minor alterations later and a warehouse foreman in Toronto got a computer printout telling him to ship ten cases of Pepsi to such and such address.

"They tend to be young, highly motivated, energetic. They respond to the challenge of game playing."
Donn B. Parker, US author of *Fighting Computer Crime*

Three of the students were 14 at the time and the ring-leader was 15.

As a result the US Attorney's office did not press charges. The Royal Canadian Mounted Police didn't prosecute because "it doesn't look good to take school chose not to take disciplinary action to spare the publicity. The companies took a philosophical view. No names were made public.

Last June FBI investigators were called in on an even larger computer freak, operated by ten home computer buffs collectively known as the "4-1-4s", after the Milwaukee telephone area code. Before they were caught they gained access to 60 computers, including the Los Alamos nuclear weapons laboratory, a cement company in Canada (an interesting coincidence) and the Memorial Sloan-Kettering Cancer Centre in Manhattan.

They began by dialling a local telephone number to connect them to a leased telephone line operated by the GTE Telenet Communications Corporation of Vienna, Virginia, which provides access to 12,000 computers across the States for some 150,000 authorised users.

In some cases, like California's Security Pacific National Bank, they simply gained access by using a manufacturer's password which left them free to peruse loan accounts for Australia and Zaire.

Neal Patrick, the only 4-1-4 named in press accounts, used a Radio Shack computer and a modem. He dialed Telenet, typed C for "connect", then an area code, then a number from 1-200. His family



The entire US Defence establishment — plus Joshua, the computer — go bananas: from War Games

solicitor arranged for immunity from prosecution for wire fraud and his parents didn't even make him pay the telephone bill he'd rung up.

If you recognise any details of this case at all, it was because it was linked up with the promotion of *War Games*, highlighted as a copy-cat crime because of the Los Alamos connection.

In fact a much closer parallel happened in November last year when Ronald Mark Austin, 19, a student at the University of California in Los Angeles and a self-taught computer operator, was arrested and charged with using his home computer to tap into US Department of Defense computers.

To be precise he broke into 200 computer files at 14 military, university and private research groups, from California to Norway.

There is no record on our files as to what happened to him.

Ironically, former Secretary of Defense Alexander Haig now

"It was a basic curiosity. We wanted to know what was going on in the world of computers. We were interested in seeing what a certain computer could actually do. It was the challenge of getting in and finding out what's there, like getting into a cave or climbing a mountain."

Neal Patrick, computer freaker

sits on the board of directors of MGM/United Artists — the makers of *War Games*. He says: "I'm confident that saboteurs or other enemy agents could penetrate segments of the system in an even more competent way

than depicted by the teenager in *War Games*.

The authorities claim that pranksters would never be able to trigger a missile launch, as they'd have to get through four major separate security procedures and the constant human checks that safeguard the 87 compu-

ters of the North American Aerospace Defense Command (NORAD) against electronic penetration. Or would they?

All this discussion may be academic as on 2 June 1980 NORAD computers reported between 20 to 2,000 Soviet missiles heading for the US. It was just a bug in the system.

FOR YOUR JARGON FILE...

HACKERS, FREAKERS and PRANKSTERS. The polite names for people who break into somebody else's computer system.

PROGRAM ZAPPING. When a hacker destroys some of the software in the system he or she has just broken into.

PIGGY BACKING. This is when a communications line serving an authorised user is tapped into. The freaker may then borrow the user's password for access to a main computer.

TIME BOMB. Here the prankster plays around with the clock in a computer system, usually to activate the system at a later date — when the prankster is not about naturally.

LOGIC BOMB. Fairly similar to the Time Bomb except the hidden routines are triggered by a combination of events rather than the computer's clock.



"Can't have been me busting into GCHQ computer time — I was doing over American Express on Friday!"

TONY BENYON

SALE! Lowest Ever Prices On

TRS-80™ Colour Computers

3658+5% 4108

16K Standard
Colour Computer

£99⁹⁵

Inc. VAT

26-3004

Save
£40



TRS-80 Standard Colour Computer With Built-In 16K Memory. The TRS-80 Colour Computer makes computing fun for the entire family! Just pop in a Program Pak for entertainment, educational or personal uses. Or, with the easy-to-use manual, learn to write your own programs in Colour BASIC. It comes with 16K of internal memory (expandable up to 32K), eight colours and a built-in RS-232 interface for easy communications ability. You can easily add a printer or joysticks, and it comes with a comprehensive instruction manual.

26-3004 £139.95 Save £40.00 £99.95

Save Even More On The TRS-80 Colour Computer With Extended BASIC. Advanced programming is more affordable than ever! With Extended BASIC, it's easy to draw highly-detailed shapes using simple, one-line commands. Produce impressive designs, charts, even animation. It's loaded with the dynamic features a serious programmer needs too, like PEEK, POKE and USR commands, multi-character variable names (two significant), string arrays up to 255 characters, full featured editing, tracing and nine digit accuracy. Includes tutorial manuals or both Standard and Extended Colour BASIC.

26-3002 £179.95 Save £40.00 £139.95

TRS-80 Colour Computer With 32K Extended BASIC.

26-3003 £249.95 Save £40.00 £209.95

Colour Computer Upgrade Kits

32K RAM Upgrade Kit. 26-3017* £79.95

Extended Colour BASIC ROM Upgrade Kit

26-3018* £59.95

Colour Computer Joysticks. 26-3008 Pair £9.95

Specifications:

Microprocessor: 6809E 8-bit processor. **Clock Speed:** 0.894 MHz.

Keyboard: 53 keys, including up, down, right and left arrows, BREAK

and CLEAR. **Video Display:** 16 lines of 32 upper case characters.

Colour graphics capabilities range from 32 x 64 (8 colours) to

192 x 256 (1 colour and background colour) with 3 intermediate

formats. Higher resolutions in the same range are available through

machine language, Extended BASIC or Program Paks. Output

connects to any standard UHF TV set and includes video and sound.

Memory: 16K internal dynamic RAM. Expandable to 32K. Colour

BASIC is in 8K ROM, 16K ROM with Extended BASIC. **Input/Output:**

1500-baud cassette (recorder optional). Connectors for two 2-

dimensional joysticks (optional). RS-232C serial I/O port. **Interrupt**

Timer: Accessible from Extended BASIC or machine language only.

Power: 240VAC, 50 Hz, 50W. *Installation required, Not Included.



Tandy®

Over 350 Stores And
Dealerships Nationwide

Six Great New Games For The Tandy Colour Computer

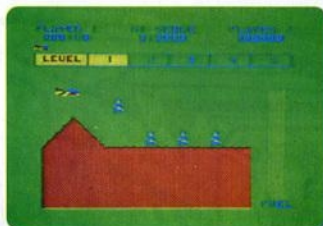
Cassette Versions of Six
Popular Games!

ONLY **£7.95**
EACH



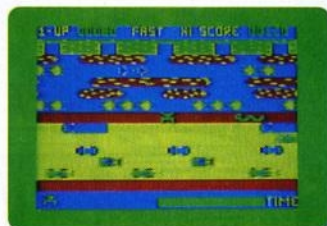
[A]

[A] CRAZY PAINTER. A high-speed arcade action game! Try your hand at painting the floor! Sounds easy? Yes, if the dogs, moths, caterpillars, boys, balloons etc. don't keep walking over the paint! Eight levels of difficulty. The catchy tunes played while you paint will have you "singing while you work". Keyboard or joystick controls. **26-7305**



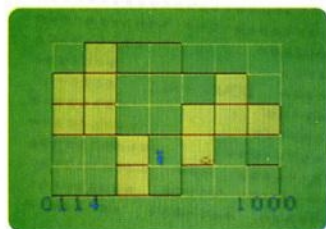
[B]

[B] SKRAMBLE. Your mission is to penetrate the enemy's system and destroy their H.Q. You will start with three spacefighters equipped with repeating cannon and twin bomb launcher. If you succeed in evading the elaborate defences, you will arrive at the core where flying becomes more difficult. Keyboard or joystick control. **26-7306**



[C]

[C] FROGGER. The popular arcade game for the Tandy Colour Computer. Safely manoeuvre the frog to its home within the time allocated. Cross the highway without getting run over and cross the river without falling in. Avoid the traffic, snakes, crocodiles and diving turtles. For one or two players. Joysticks optional. **26-7304**



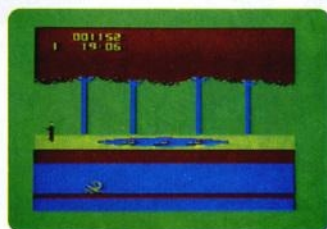
[D]

[D] CUTHBERT GOES WALKABOUT. Cuthbert must turn the lights of the lunar landing pad on by walking across the switches before the invading Moronians get him. Watch him do his victory dance before he tackles the next "pad" and another, larger, set of invaders. Superb colour graphics with music. Keyboard or joystick control. **26-7302**



[E]

[E] CUTHBERT GOES DIGGING. Cuthbert is guarding the site for a new launch pad. However the Moronians are still determined to get him! One touch and Cuthbert is electrocuted. The only way he can kill them is to trap them in a hole and hit them with his insulated hammer before they escape. Keyboard or joystick control. **26-7303**



[F]

[F] CUTHBERT IN THE JUNGLE. A high speed arcade action game with full colour graphics! Cuthbert failed to overcome the Moronians so he has been sent to the jungle! He must fight his way out collecting treasures, jumping pits and swinging over alligators whilst being aware of the killer scorpion. One joystick required. **26-7301**

Tandy

Tandy Corporation (Branch UK),
Tameway Tower, Bridge Street,
Walsall, West Midlands, WS1 1LA.

DOWNFALL

You man the last photon turret emplacement on Kelp III, a colony asteroid now cravenly abandoned to the advancing Fnurrgs. It's pretty tacky equipment — and what's worse, the Automated Battle Computer has clapped out for lack of maintenance (the old story). Align your sights on the remorselessly descending Fnurg Landers and do your duty. Don't let them land!

for BBC

by JONATHAN ADAMS
ILLUSTRATION: ROBIN SMITH



CONTROLS

x,y turret training (horiz.)
.,/ gunlaying (vert.)
space bar pulls the trigger

>LIST

```

1 VDU 15
2 REM *****
3 REM ***** WRITTEN BY *****
4 REM ***** JONATHAN ADAMS *****
5 REM *** PROGRAMMER/DIRECTOR ***
6 REM ***** OF ADOSOFT *****
7 REM #####
10 REM *****
20 REM *****
30 REM *****
40 REM *****
50 REM ***** DOWN FALL *****
60 REM *****
70 REM *****
80 REM *****
90 REM *****
100 REM *****
110 REM *****
120 MODE 7
130 PROCINTRO
140 MODES
150 EK%=0:FR%=0
160 VDU19,1,12,0,0,0
170 PROCCHARACTERS
180 HI%=0:DIM Z(100,2)
190 SC%=0:LV%=3:R%=10
200 FOR TW%=0 TO 5
210 SOUND1,-10,235,1
220 OT%=TW%
230 B%=25
240 GF%=0
250 PX=9:PY=10:CLS
260 PROCSHOW
270 I%=1
280 PROCDOTS(100)
    
```



```

290 PROCPAY
300 IF IZ=1 THEN IZ=2 ELSE IZ=1
310 PROCMOVE
320 SOUND0, -(RND(5)+10), 7, 1
330 IFLVZ<1 PROCSPLAT:GOTO 190
340 FORLPZ=1TORZ+(RZANDFRZ=0)
350 PROCmove
360 COLOUR 2
370 PRINTTAB(2,31);SCZ;"0";TAB(17,31);
LVZ;
380 COLOUR 3
390 PROCZAP
400 NEXTLPZ
410 IFEKZ=TWZ+1 EKZ=0:NEXT TWZ
420 IF TWZ=6 RZ=RZ-1:GOTO200 ELSE300
430 REM DATA
440 DATA 24,24,36,231,231,36,24,24,102
,153,60,90,126,60,66,129,129,90,60,90,12
6,60,66,36,255,255,255,255,255,255,2
55
450 END
460 REM PROCEDURES
470 REM
480 DEFFROCCHARACTERS
490 FOR Q=224 TO 226
500 READ AAZ,ABZ,ACZ,ADZ,AEZ,AFZ,AGZ,A
HZ
510 VDU23,Q,AAZ,ABZ,ACZ,ADZ,AEZ,AFZ,AG
Z,AHZ
520 NEXT
530 READ AAZ,ABZ,ACZ,ADZ,AEZ,AFZ,AGZ,A
HZ
540 VDU23,255,AAZ,ABZ,ACZ,ADZ,AEZ,AFZ,
AGZ,AHZ
550 ENDPROC
560 DEFFROCDOTS(PZ)
570 FOR A1Z=1TOPZ:GCOLO,RND(3)
580 PLOT 69,RND(1280)-1,RND(900)+123
590 NEXT

```

```

600ENDPROC
610 DEFFROCINTRO
620 CLS
630 PRINT
640 PRINTTAB(12)CHR$(130)CHR$(141)"DOW
N FALL"
650 PRINTTAB(12)CHR$(132)CHR$(141)"DOW
N FALL"
660 PRINT:PRINT:PRINT
670 PRINTTAB(5)"WARNING! ALIENS ADVANC
ING"
680 PRINT:PRINTTAB(2)"MOVE YOUR SIGHTS
EXACTLY OVER THE"
690 PRINT:PRINTTAB(2)"ALIEN AND FIRE B
EFORE IT SLIPS OUT OF"
700 PRINT:PRINTTAB(2)"YOUR SIGHTS. FOR
EACH ONE THAT LANDS"
710 PRINT:PRINTTAB(2)"THE DAMAGE IS EN
OUGH THAT IT DESTROYS"
720 PRINT:PRINTTAB(2)"ONE OF YOUR SHIP
S"
730 PRINT:PRINT"          Z - LEFT      X
- RIGHT"
740 PRINT:PRINT"          : - UP        /
- DOWN"
750 PRINT:PRINT"          SPACE BAR
- FIRE"
760 PRINT:PRINT"          SPACE BA
R"
770 REPEAT UNTILGET=32
780 ENDPROC
790 DEFFROCMOVE
800 FOR AZ=0TOTWZ
810 IFZ(AZ,2)=0 GOTO900
820 PRINTTAB(Z(AZ,0),Z(AZ,1));SPC1
830Z(AZ,1)=Z(AZ,1)+1:Z(AZ,0)=Z(AZ,0)+(
RND(3)-2)
840 GZ=Z(AZ,0)
850 IFGZ<1Z(AZ,0)=1
860 IFGZ>18Z(AZ,0)=18
870 IFZ(AZ,1)=29 AND GZ=30RGZ=16 Z(AZ,
0)=Z(AZ,0)+1
880 COLOUR1:PRINTTAB(Z(AZ,0),Z(AZ,1))C
HR$(224+1Z)
890IFZ(AZ,1)=29Z(AZ,2)=0:LVZ=LVZ-1:EKZ
=EKZ+1:FORSZ=1 TO2:SOUND1,15,5,4:SOUND1
,-15,1,4:NEXT
900 NEXT
910 ENDPROC
920DEFFROCMove
930 OX=PX:OY=PY
940 IF INKEY-98ANDPX>1GFZ=GFZ-1
950IF INKEY-67ANDPX<18GFZ=GFZ+1
960 IFABS(GFZ)=2PX=PX+SGN(GFZ):GFZ=0

```

Continued
on page 78



ARCADE

ALLEY

'GOD IS ALIVE
AND WELL AND
WORTH 10,000
POINTS'

Checking out a "Wimpy Bar in Hell". BIG K Arcades Editor PAUL RAMBALI encounters Manic Waterskiers, Dragonslayers (would-be) and a new species of dangerous alien — the Committed Disapprover (female). His solution? Zap first and answer questions afterwards...



THERE I was, pausing a moment to review tactics, mentally replaying my last fatal encounter with the alien Pod and its cargo of malevolent Swarms. There I was, fingering the coins in my pocket, when this girl asked me: "Why is it you never see girls playing video games?"

Normally, I do not care to talk to girls while I am busy defending earth. I could have simply fled to another arcade. I could have wiped her from my screen with a Smart Bomb. I could have cited the wellknown fact that girls are boring.

"Dunno," I muttered. I was going to say Pac Man but thought better of that too.

The girl was a parole counselor, working with minor offenders aged between 17 and 26. This, however, did not grant her any new insights. She didn't know why girls don't play video games. Dragged into the

arcades by their boyfriends — as sometime happens — they loil impatiently by the machines, frustrated by the competition from these gurgling, twinkling contraptions.

She nonetheless suspected that there is a *good reason* why girls don't play them, that they somehow *know better*. They aren't hoodwinked by the dub-

ious pleasures of lights, noise and high-speed rocket fire. They can intuitively sense the dangers of a build-up of gamma wave radiation from long hours at the screens. They are unmoved by the natural masculine propensity for war and destruction that

many games thrive on.

This is the sort of condescension that the mature video gamer must endure as he guiltily feeds another few coins to the hungry Gorf, envying the gleeful, guiltless abandon — not to



BE AN IN-AT-THE-DEATH STAR

IGNORE THE wall-standing version and get straight into the cockpit of Luke Skywalker's long fighter, where you will be greeted by the theme from *Star Wars*. With R2D2 bleeping in your ear, you'll soon be plunging through space towards a Death Star guarded by relatively few enemy ships. These are dealt with quickly enough. Use of the force that Sir Alec Guinness extols over your shoulder is not recommended. Concentrated laser fire is best. With Sir Alec's help, you'll then find yourself steering down a channel on the Death Star's surface, parrying the odd Empire salvo or two. So far, so easy. Next, you have to get out of the channel via an exhaust port, which Luke himself tells you with a satisfied yelp is "dead ahead!"

This is not so easy. In fact, it's a bitch.

It cost me dearly to learn that you actually have to blast your way through it, and not rely on the Force that seems to grip your controls at this point.

Thereafter, things get more complicated, enemy fire multiplies, but no other feats of lateral thinking are required. Your second pass takes you down to the surface of the Death Star where you can blast away at enemy towers until your shields are gone, or your money, or your taste for space games. With its three-colour 3D vector graphics, *Star Wars* is the best space-flight simulator yet. It doesn't offer any great complexity, but it's great while it lasts.



mention the effortlessly superior scores — of the 10-year-old Vid-Kid at the next machine.

But this girl had another complaint. One of her charges — a 7-year-old — had been arrested for shoplifting goods worth just a few pounds. He told her of a formidable career in the field, the fruits of which — over £100 a week — paid for an ever more urgent fix of the arcade drug.

It's not an unusual story. In 1980, a 12-year-old in Japan walked into a bank armed with a shotgun and demanded not bills but coins — you can guess what for. Rattled by such tales, Labour MP George Foulkes warned the House of Commons in 1981 of a nation (ours) overrun by "youngsters with glazed eyes!" His Tory opponent Michael Brown — who later confessed to having had a few games himself on the way to the

House — denounced this intrusion of the welfare-state mentality into the genial gonzo pleasures of the populace and carried the day.

Foulkes was left mumbling that video games are a kind of glue, equally toxic and mind-sucking, the potential cause of a wave of petty crime. The parole counsellor agreed. She sent her 17-year-old to Gamblers Anonymous to try to cure his coin-sloth fever. Instead of sharing his woes with executives broken on the roulette wheel and bingo-playing housewives with glazed eyes, the 17-year-old found himself surrounded by fellow Humanoids, their lives wrecked by the untiring vigil they had selflessly maintained against the encroaching alien hordes.

It struck me that there is one last hope for them. We'll call it Shoplifter or maybe Arcade

WALKING THE DORK (NUDGE, NUDGE)

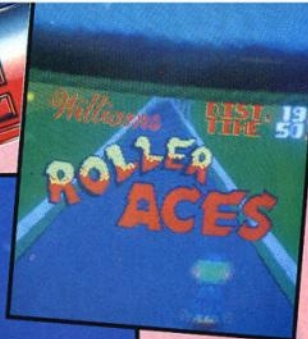
PRESENTLY languishing in prime sites, its movie-thriller type come-on and full animation screen (not to mention its appetite for 40p upwards a game) somehow failing to attract droves of players, is *Dragon's Lair*. Using a videodisc to generate the fast-moving and fully-detailed cartoon action on the screen, *Dragon's Lair* should have been impossible to get a game on by now. Trouble is, it's impossible to play to begin with. Yanking the joystick and pumping the sword button have no apparent effect on the good knight Dirk as he stumbles from ordeal to cliffhanger. Or perhaps Dirk himself is the problem. An amiable, gangly buffoon whose expressions range from wary indecision to grim effort to startled panic is hardly the stuff of gallant fantasy. Who could want to identify with this twerp? Adding insult to injury, the novice finds Dirk's five lines and his 40p indecently quickly spent. The trick, it turns out, is to nudge the controls at precise moments to steer Dirk through the gauntlet of medieval and supernatural nemeses. Skulls, ghouls, ectoplasm and living slime etc. can sometimes be put to the sword and sometimes not, in which case it's better to run — through crumbling passages, over chasms, down rapids — taking care not to make a wrong turn. Figure out your own way through the labyrinth of perils that leads to the Dragon's Lair. Once there, you'll see a shadowy hooded figure (slice him like salami) and ambulating blobs of brown goo (dodge these). The girl in the fishbowl that you have come to rescue is getting excited by now, and a pile of treasure threatens to topple, alerting the sleeping dragon nearby. I've yet to witness what happens after Dork, sorry, Dirk, despatches the dragon and gets the girl, but I hope it was worth it.

Craze. You are a Vid-Kid being hounded through the local shopping precinct by teachers and parents who bomb you with homework or visits to relatives.

Your aim is to play all the different games in your district and to do this you have to augment the money you have at the start by various small larcenies.

Each new level adds greater perils — truant officers, police, etc. — and takes you closer to the West End, where you must negotiate winos, hustlers and other vermin to reach the Ultimate Game. But Arcade Craze has a nasty twist: an electrified joy-stick! A few prolonged bouts of this aversion therapy should be enough. The words

ARCADE ALLEY



ROLLERBALL WAS NEVER LIKE THIS

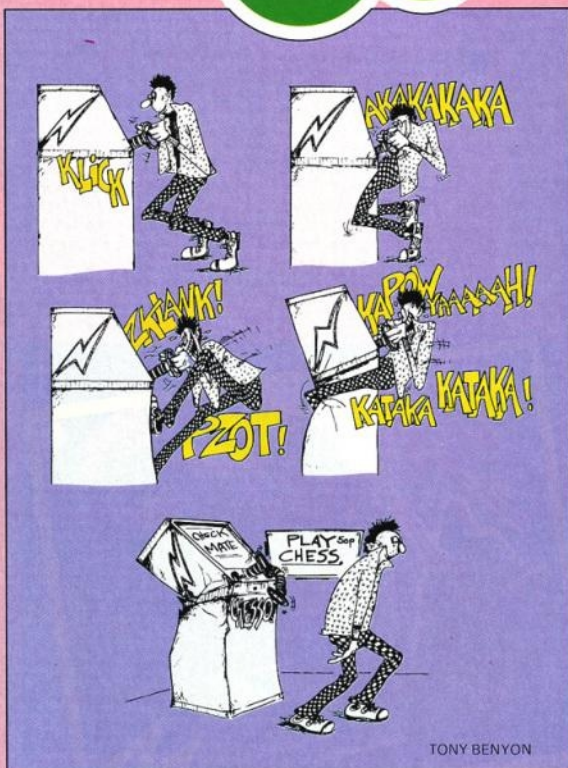
THESE TWO cute variants of the Pole Position scenario have been turning up at a few soak sites lately. Using the same sort of display — a track receding to a vanishing point at the top of the screen — they promise spills other than the oily sort.

In *Roller Aces* you are a street-skater whizzing down a track littered with rocks and pitted with holes. You can move left and right and — with enough speed — jump over obstacles. Naturally, these tend to increase, and the game hots up when two other skaters start chasing you and have to be elbowed out of the way before they can elbow you.

All of which is pretty good arcade action. But — considering the graphic verisimilitude of the skater — more though might have been given to the details. A street scene would have been better than a track, and the sack of money you must pick up for extra points should obviously have been a ghetto-blast.

More fun, but harder to master, is *Tropical Angels*, in which the track is a stretch of water. You steer a speed-boat pulling a water-skier through a far more realistic course. She — for it is a she — has to jump over rocks and off ramps to score points. A neat, refreshing game with excellent visuals, *Tropical Angels* may still face unwarranted arcade death due to its lack of the familiar aggressive elements.

'With one knee against the machine and the other leg stretched back, with spine upright and arms straight, the Defenders sway back and forth to the digital rhythm of play, forefinger near permanently on Thrust, middle finger agitating the Fire button, thumb poised over the Smart Bomb. This is the stance of the True Defender, his uniform a Tacchini track suit zipped up to the chin.'



TONY BENYON

'Ready Player One', rather than quickening the pulse, would fill them with horror.

The girl thought she could see a flaw in this. What would drive an arcadophile to stay on the console? Simple. The lure of the Ultimate Game. The final level would be the game itself; with super-fast 3D vector graphics and the noise levels of the Hea-throw flightpath. What sort of game would it be? Who knows. Ever since this thing started in Nolan Bushnell's bike-shed, the debate has raged. The finest minds of our generation, while not busy improving their hand-eye co-ordination, have wrestled with this philosophical abstraction. Does God exist? Who cares? The real question is: how many points is he worth?

Defender has become a kind of relaxation in the arcades these days. Its customers are either veteran Defenders taking a breather from some

new challenge ... or social scientists. You can always spot a social scientist doing field work in the arcades by their embarrassed grimaces as they play — unprepared for the simple excitement and humiliated by a quick defeat. Also, they are liable to ask you about video games; the last thing you want while you're playing one. Arcades are places of intense human science, which is as it should be. Even the goon at the change desk knows this. He doesn't even look up, let alone open his mouth.

But if they knew where to look, the social scientists could still see a True Defender in action. In the Electric Ballroom on Friday nights, I've seen Defender clocked at around wave 56 and with a score of a million, not 100,000 as on some machines. Here, above the noise of the latest electrobeat import from New York — the perfect

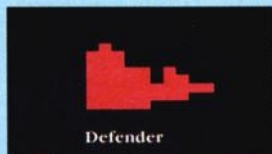
microprocessed soundtrack — the True Defenders make their stand, the really wicked games are fought.

With one knee against the machine and the other leg stretched back, with spine upright and arms straight, they sway back and forth to the digital rhythm of play, forefinger near permanently on Thrust, middle finger agitating the Fire button, thumb poised over the Smart Bomb. This is the stance

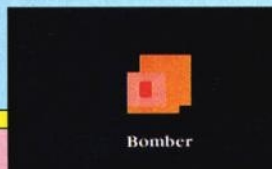
of the True Defender, his uniform a Tacchini track suit zipped up to the chin.

And I salute him. Someone has to test the fearful mathematics of the games, exhaust their novelties, ascertain their nuances. Someone has to go armed with only their wits and reflexes into the video arena, the arcades that somebody or other called Wimpy Bars in Hell. And what better setting for this fast food of the vacationing intellect?

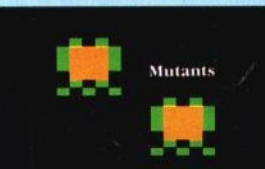
"But what is it about arcade games?" Pressed the girl finally. I told her they were the modern-day fairground rides. I told her to try one. There wasn't time to say more. The Landers were already drifting earthwards...



Defender



Bomber



Mutants



BRILLIANT BODGES

BIG K SOLDERS ON...

BUILD YOUR OWN CHEAPO EPRO!

EPROMS COME in all shapes, sizes and capacities. The programmer will be able to read and program the two types that can be used in the BBC computer — the 2764 and the 27128. The 27 is a 'family number' for EPROMs, and the 64 and 128 refer to the capacity of the chip in K bits. Since the BBC uses an 8-bit processor — meaning it talks in terms of 8 bits (one byte) at a time, dividing the 64 or 128 by 8 gives the number of bytes in each chip ... 8K or 16K. The 8K 2764 chips are — surprise, surprise — cheaper than the newer 27128s, but neither are exactly penny chews ... you can pick up a 2764 for less than a fiver, but the 27128s are prohibitively expensive at £18 a time. However, this is mainly because the 27128s are only recent developments, and the manufacturers are frantically trying to recoup all their R&D money, so expect to see the price plummet over the next six months.

Similar Chips

The BBC also uses ROM chips which are very similar, but for one big difference: you can't re-program them as you can an EPROM. They also use the 64/128 system of identifying the capacity of the chip, but with a prefix different to 27, to show they're ROM and not EPROM.

The Programmer described in this article was designed to be easy to use, elegant and self contained ... and also inexpensive. Malison Electronics are currently marketing a (admittedly slightly more complex) programmer for £185. The BIG K programmer will cost less than £30 to build, including the case and leads and all that stuff. More importantly, as this programmer was being designed, in early January, nobody had any programmers available off the shelf except — predictably — the £185 models. Both Technomatic and Watford Electronics do cheaper versions at about

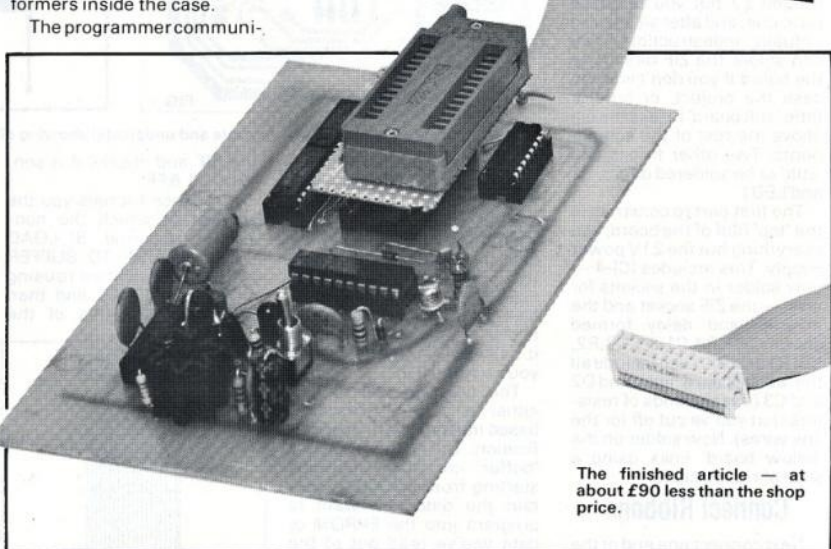
£100 after VAT, but the only sign of either so far are promo photographs.

Neat Switch

The BIG K EPROM Programmer also contains its own on-board 21V power supply, derived from the computer's 5V supply using a neat Texas Instruments switching regulator, the TL497, so there's no need to plug it into the mains or have bulky transformers inside the case.

The programmer communi-

Erasable, programmable ROM chips or carts are an uncharted sea for even the most dedicated hackers. ANDY GREEN tells you how to build your own for the BBC Model B. Irons at the ready? Then plug 'em in and get wiring ...



The finished article — at about £90 less than the shop price.

cates with the computer by a ribbon cable leading to the User Port on the underside of the BBC. A short Machine Code/BASIC program is also included to run the programmer through a series of easy-to-use menus.

You may be wondering what such a device would need with 21V, since the BBC hasn't got any supply lines of anything near that voltage. Well, the EPROM only needs your average everyday computer 5V when you're trying to read from it, but when you are writing to it, i.e. programming it, it needs 21V to 'burn in' the data. Once it's in, the chip 'remembers' the data until you go through the era-

sure process to prevent this.

Erasing an EPROM consists of exposing the device to ultraviolet light for a few minutes (you wondered what the little window on the top of the chip was for, didn't you?).

Exposure

Simply, when the light hits a cell inside the chip, it boots out the electrons you so carefully put in with your 21V, leaving it empty. This empty state equates to a logic 1, so after erasure an EPROM is full of &FF bytes. The programming process fills some of the cells up with electrons, which is read as being a logic 0. Yes, you've guessed it, this is why

they cover up the window with tape after the EPROM has been programmed. No, it wasn't to stop you peeping, but to keep out daylight and any spare UV light it might carry with it. Remember, after erasure, cover the window with coloured tape.

Figure 7 shows a block diagram of how the programmer works. Twelve of the 14 address lines the EPROM needs are got from a set of 3 four bit counters. The reasoning behind the choice of computers instead of just connecting discrete 10 lines is to minimise the number of connections that need to come from the computer, in this case only eight, from the



BRILLIANT BODGES

user port, plus one extra line CB2, also from the user port, that decides whether the other eight are to be sent to the EPROM data lines or an 8 bit latch, 74LS374. The 21V power supply is connected to the EPROM with a switch, S1, so giving the user final control, for safety's sake.

NOTE: Never take out an EPROM while the 21V power is on, as the manufacturers say this will kill your EPROM. If you must abort a programming session, first switch off the 21V at S1 then pull out the chip.

To the construction of the project... it's mounted on single-sided PCB about 4" by 2" with a ZIF (Zero Insertion Force) Socket for the EPROM you are using. The ZIF is accurately expensive at around £7 but you've got to have one, and after all, they're virtually indestructible. You can solder the ZIF directly to the board if you don't want to case the project, or build a little 'stilt board' to take the ZIF above the rest of the components. Two other things can 'stilt' or be soldered direct, S1 and LED1.

The first part to construct is the 'top' half of the board, i.e., everything but the 21V power supply. This includes IC1-4 — only solder in the sockets for now — the ZIF socket and the inverter and delay formed about TR1, R4, C1, D1, C7, R2, C6, R1 and R3. Also include all the 'above board' links and D2 and C3 (use the ends of resistors that you've cut off for the link wires). Now solder on the 'below board' links using a slice of ribbon cable.

Connect Ribbons

Next connect one end of the main piece of ribbon cable to the 20-way IDC connector for the user port, making sure that the wire with the red stripe goes to pin one on the connector. At the other end of the ribbon cable, peel off each wire to about an inch and cut off some of the wires as in Figure 3 — make sure the red

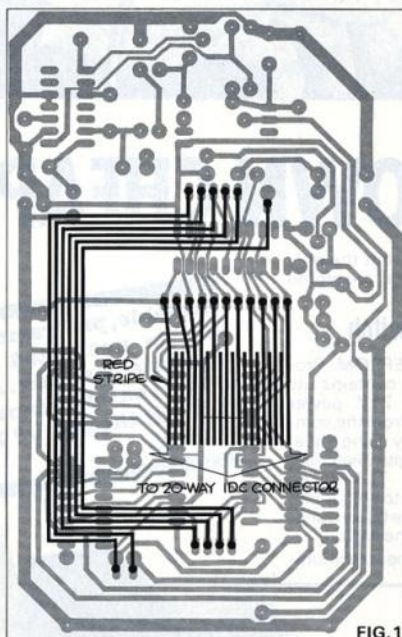


FIG. 1

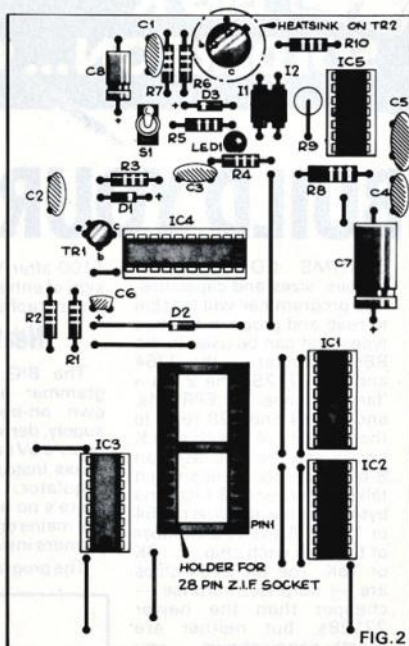


FIG. 2

The completed circuit (topside and underside) showing all components in position.

stripe is in the same position as in the diagram! Now solder the remaining wires to the pads as in Figure 3.

Put the hardware to one side for a moment and now type in the software. Be especially careful with the Assembly code at the end, and save it to disc or tape before running it. Check it through after you've typed it in.

The program will run on either a disc- or cassette-based machine with no modification. The program uses a 'buffer' in main memory, starting from &3000 to contain the data you want to program into the EPROM or data you've read out of the EPROM.

Tells Address

The main menu will pop up after a short pause and ask which of four functions you want to use. The four are A) TEST FOR ERASURE — this goes through the EPROM in

the ZIF and checks if it contains all &FF.

If it doesn't it tells you the address at which the non-erasure occurred. B) LOAD FROM EPROM TO BUFFER will first ask you if we're using a 2764 or 27128 and then dump the contents of the

EPROM currently in the ZIF to a memory buffer starting from &3000. C) DUMP TO EPROM asks you if we're using a 2764 or 27128 and then dumps out the appropriate amount of memory from &3000 onwards to the EPROM, starting from the first byte in the

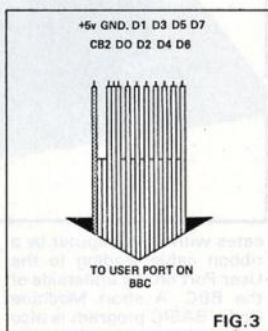


FIG. 3

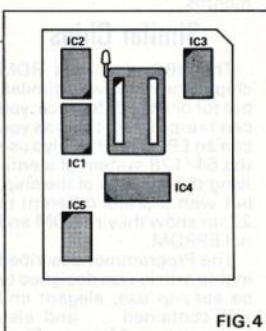


FIG. 4

Ribbon cutting pattern (left) for the BBC User Port Cable (programmer end). Note position of index strand. Right: Orientation of ICs and ZIF. View from above.

CAPACITORS	RESISTORS	SEMICONDUCTORS	THE REST
C1 = 0.05μF	R1 = 39KΩ	TR1 = BC108	I1 = 47μH I2 = 22μH
C2 = 0.05μF	R2 = 1KΩ	TR2 = 2N3553	LED1 = Red LED
C3 = 0.05μF	R3 = 10Ω	IC1 = 74LS161	S1 = SPST miniature switch
C4 = 0.05μF	R4 = 10KΩ	IC2 = 74LS161	T05 heatsink for 2N3553
C5 = 150pF	R5 = 10KΩ	IC3 = 74LS161	28 pin ZIF socket
C6 = 10pF	R6 = 21KΩ	IC4 = 74LS374	16 pin DIL sockets
C7 = 220μF @ 10V	R7 = 1.2KΩ	IC5 = TL497	20 pin DIL socket
C8 = 22μF @ 25V	R8 = 0.5Ω 1W	D1 = IN914	14 pin DIL socket
	R9 = 33Ω 1W	D2 = IN914	Link 1 — Use resistor 'cutoffs'
	R10 = 18KΩ	D3 = IN914	Link 12
			PL1 = 20 way IDC nn socket
			= 1m. of 20-way ribbon cable

EPROM. D) COMPARE BUFFER WITH EPROM offers an easy way of verifying a good programming session on an EPROM.

Right now we can only use options A, B and D, since we don't have the 21V power supply built yet. Plug in the board to the user port on the BBC and use a voltmeter to check for 0V at pin 8 on ICI-3, 0V at pin 14 on the ZIF and 0V at pin 10 on IC4. There should also be 5V at pin 16 on ICI-3, 5V at pin 28 on the ZIF and 5V at pin 20 on IC4. If all that's OK then unplug the user port connector and plug ICI-4 into their sockets (make sure they're the right way round) then plug the User Port connector back into the BBC.

&3F for a 27128. Then it will return you to the main menu. If this didn't happen, you've a bug in the program you typed in... get a friend to check it against the listing.

The number was the 'block' of 256 bytes the program was currently reading... 32*256=8192=8K capacity of a 2764. This appears whenever the program is accessing the EPROM and is designed to reassure the user that something is actually happening.

You should now have a copy of the contents of the EPROM in the ZIF in memory from &3000 to &4FFF (up to &6FFF if you're using a 27128). If you've got DISC DOCTOR then you can use the MZAP function to check it out. If you

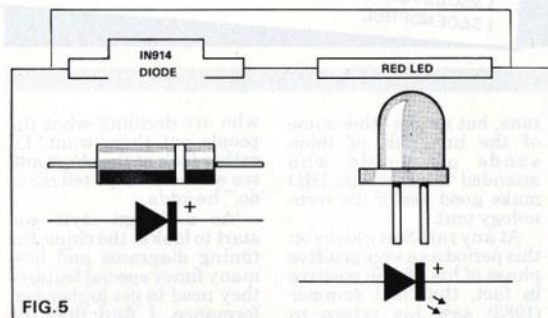


FIG. 5

Diode orientation.

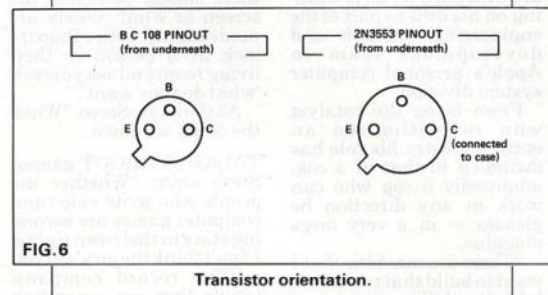


FIG. 6

Transistor orientation.

Old ROM

Now you're going to have to get your hands on a used EPROM, i.e., one full of data, or an old ROM that has been used in a BBC. Possible contenders are old OS ROMs, old BASIC 1 chips etc. We are going to need this to check that the programmer is reading from the ZIF socket correctly.

Plug the EPROM into the ZIF — make sure the notch is pointing in the right direction for pin one — and select option B on the menu. A two digit number should appear in the top centre of the screen and increment from &00 to &1F if you're using a 2764 or

haven't got DISC DOCTOR then either *SAVE &3000-&5000 if you've got a disc system and do a *DUMP, or — for you cassette people — use a FOR/NEXT loop to print out the contents of the buffer.

However you do it, the buffer should contain mostly unrecognizable garbage, but the ASCII of some areas should produce appropriate words — e.g. near the start of the BASIC ROM there's a list of commands that it supports in ASCII. If it's all come out as a load of &FFs then in addition to doing the checking below, examine the diodes... are they the right way round?

Check to see that 'zones' don't repeat themselves in

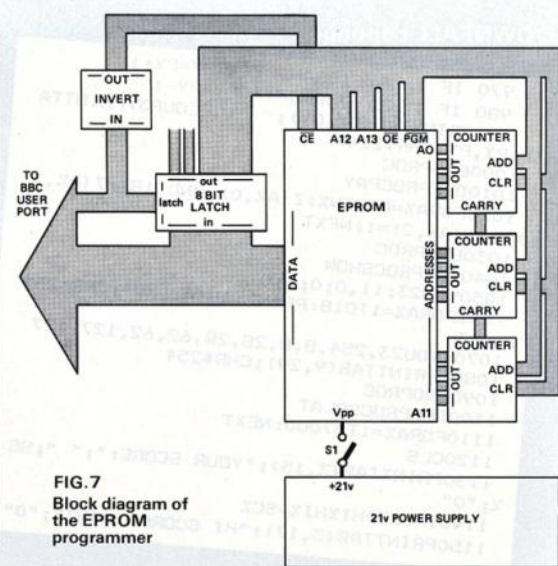


FIG. 7
Block diagram of the EPROM programmer

sets of 256 bytes, and that the whole 8 or 16K is filled with the strange numbers. If any of the above errors are true, check the wiring of the address counters ICI-3 and make sure that all the legs of the ICs are inside their sockets and not bent under the chip body.

If everything seems OK so far then unplug the board — it's time for the 21V power supply. As I mentioned before, the 21V supply is based around the TL497 switching regulator. Unfortunately, it isn't beefy enough to handle the 60 odd milliamps we're going to be pulling through it, so it uses a 2N3553 transistor as well. Technomatic are the only people I know to stock the TL497, and Henrys are the only people in the Edgware Road to stock the 2N3553. The transistor will also need a TO5 heatsink 'hat' because it gets quite hot.

Don't Worry

Two other weirdo components in the 21V design are the 47 and 22 microHenry (no relation) inductors, and I could only get these from Cricklewood Electronics. They don't care which way around they're mounted, so don't worry. Of course, you could take the easy way out on all this hunting down and order a complete kit (including PCB) from the address at the end of the article. After train and bus fares, it's a good deal.

Anyhow, back to the 21V construction. The two large power resistors 0.5 ohms and 33 ohms will get rather warm, so mount them away from other components.

For starters, only solder in the socket for IC5 and don't insert the chip yet. Make sure the ZIF is empty, and connect the board back up to the BBC. Check IC5 pin 14 for 5V and pins 2, 4 and 5 for 0V. If it's OK then — make sure the ZIF is empty again — insert IC5 and, if it isn't lit already, flick S1 to make LED1 light up. Now test pin 1 on the ZIF with your voltmeter. It should be around 21V, perhaps a little more, but that will come down under loading.

If it ain't, then unplug the board from the BBC and check orientation of a) transistor 2N3553, b) IC5 TL497, c) Zener diode, d) the IN914 diode, e) the LED itself and f) C3, the negative side of which should be connected to the 0V rail.

Looking good

Assuming all's well, flick switch S1 to turn off the 21V at pin 1 on the ZIF — measure it and see. The LED should now be off and pin 1 on the ZIF at 0V. Okay, things are looking good.

Now might be a good time to mention that you can only program an EPROM once between erasures, and EPROMs are only rated good for about 30 erasure/programming cycles.

If you don't have access to a source of UV light — a sunray lamp or UV PCB making equipment — then take my advice and DON'T buy a ready-made one. One with a timer costs up to £60! All you need is an unfiltered UV bulb — Watford Electronics flog them for £8 a time — some three core wire, a plug, a case

Continued on page 94

```

970 IF INKEY=105ANDPY<27PY=PY+1
980 IF INKEY=73ANDPY>0PY=PY-1
990PRINTTAB(0X,0Y); " ":COLOUR3:PRINTTA
B(PX,PY)CHR#224
1000ENDPROC
1010DEFFPROC PAY
1020FORAZ=0TOTWZ:Z(AZ,0)=RND(18):Z(AZ,1
)=0:Z(AZ,2)=1:NEXT
1030ENDPROC
1040DEFFPROC SHOW
1050VDU23;11,0;0;0;0
1060FORAZ=1TO18:PRINTTAB(AZ,30);CHR#255
:NEXT
1070 VDU23,254,8,8,28,28,62,62,127,127
1080 PRINTTAB(9,29);CHR#254
1090ENDPROC
1100DEFFPROC SPLAT
1110FORAZ=1TO7000:NEXT
1120CLS
1130PRINTTAB(3,15);"YOUR SCORE:";" ";SC
Z;"0"
1140IFSC>HIZHIZ=SCZ
1150PRINTTAB(3,17);"HI SCORE  ":"HIZ;"0"

```

```

1160*FX,15,0
1170COLOUR3:EKZ=0
1180S=GET
1190ENDPROC
1200DEFFPROC DOTS(AZ+RND(10))
1210FORAI=1TOAZ:GCOLO,RND(3)
1220PLOT69,RND(1280)-1,RND(900)+123
1230 NEXT
1240ENDPROC
1250DEFFPROC ZAP
1260FRZ=0
1270IF INKEY=99ANDBZ>0FRZ=608
1280IFRZ=0 ENDPROC
1290FX=64*PX+32:FY=1024-(32*PY)-16
1300FR1Z=96
1310MOVEFRZ,FR1Z:DRAWFX,FY:GCOLO,0
1320FORYZ=0TOTWZ:IFPX=Z(YZ,0)ANDPY=Z(YZ
,1)ANDZ(YZ,2)<0Z(YZ,2)=0:SCZ=SCZ+11-RZ:
EKZ=EKZ+1:SOUND1,-15,100,1:SOUND1,-14,2,
1:SOUND1,-15,200,1:ELSESOUND1,-10,235,1
1330NEXT
1340MOVEFRZ,FR1Z:DRAWFX,FY:GCOLO,3
1350BZ=BZ-1:PRINTTAB(6,31);BZ;CHR#32;
1360ENDPROC

```

WOZNIAK Continued from page 36

look at artificial intelligence but not from the point of view of studying how it is done or by spending hundreds of man hours writing some software. I want to find some clever trip. I think there has got to be some simple way by which you will write one little five-page program and that will allow the computer, based on all of its sensory inputs and all of its motor outputs, to learn."

He disputes the theory (rife in some quarters) that if the software could only be good enough a computer would immediately be able to compete with humans in specific areas.

"Everybody thinks that if we are so smart and can figure out how a game like chess is played or how we speak a language then this knowledge can be programmed into a computer," says Steve.

"What they are forgetting is the fact that it takes an entire lifetime to learn how to speak a language properly, and words used with certain looks and certain expressions will not necessarily mean the same to another person unless you have all grown up in the same world. Computers cannot be taught all that.

"How can a computer create music? After all for a person to decide what is good music involves all of the perceptions of our life, like all the joys and the sadnesses, and the exhilarations. This is what you sense when music is being played and so a computer that has never lived a life could never

make that judgement.

"So I think a computer basically needs a simple program that just allows it to accumulate knowledge very slowly throughout its life.

Tessler's Law

"But I will not try to define what an intelligent machine is to me, because it turns out that with any definition today the computer is nowhere near it. There is a thing called Tessler's law — which is actually named after a guy who works at Apple — which says that any time a function is thought to be intelligent and is then programmed into a computer, the definition of intelligence is modified to exclude it — and that has been going on for a couple of decades now," comments Steve.

Three years ago Steve had what you might call a bad year. His marriage fell apart. He was in a plane crash. And he finally faced up to the fact that he was not a "Run Over People type person or a Run An Organization type person."

He left Apple.

Complete change?

Throughout 1982 and quite a lot of 1983 he was the driving force behind two festivals aimed at proving that rock music and information technology could be soulmates. How successful this attempt at fusing the two ideologies was is debatable. On the one hand Steve lost \$21 million of his own for-

tune, but on the other some of the hundreds of thousands of people who attended the festivals DID make good use of the technology tent.

At any rate Steve looks on this period as a very positive phase of his life. So positive in fact, that last summer (1983) saw his return to Apple. But this time things are different, as he is working on his own as part of the engineering research and development team in Apple's personal computer system division.

From being the catalyst who revolutionised an entire industry his role has dwindled to that of a cog, admittedly a cog who can work in any direction he pleases — in a very large machine.

"There is a machine that I want to build that can calculate pi to a billion digits. And I know how to do it!

"I have also got some software projects I want to work on, and I could do pretty much all of this work at home. But I am here because I want to be part of Apple," Steve explains.

Idyllic as this may sound, in reality Steve is perhaps trying to blow out his bohemian image. Pi to a million digits or not, his first work back at Apple is on major projects with a project direction defined by the marketing department.

"But I really do want to do a couple of my own projects. I could not sit down and have them totally defined by the marketing department

who are deciding what the people out there want. I'd rather look at the chips and see what the chips tell me to do," he adds.

"As a design style you start to look at the chips, the timing diagrams and how many fancy special features they need to get higher performance. I find that the chips tell me how many dots there should be across the screen or what colours are needed much better than if I look at a person in their living room and ask yourself 'what do they want?'"

As they say, Steve, "When the chips are down..."

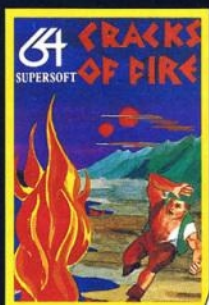
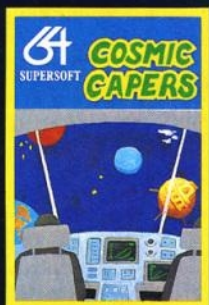
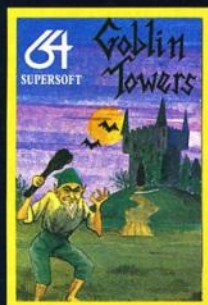
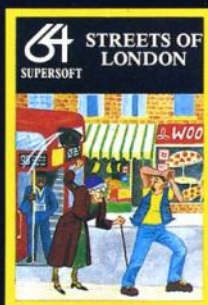
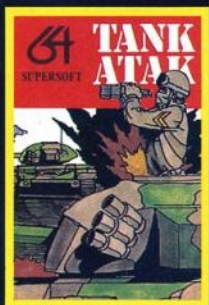
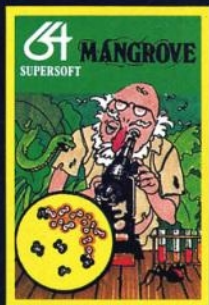
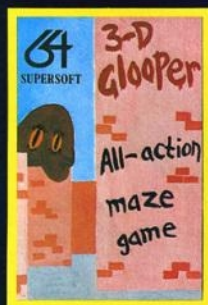
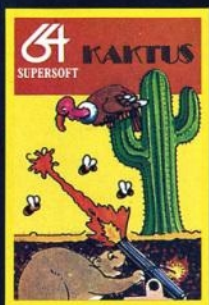
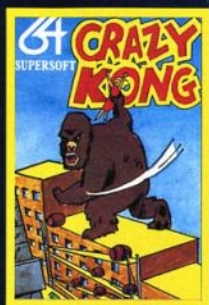
TALKING ABOUT games, Steve says: "Whether the people who write video and computer games are becoming stars in their own rights, I don't think the jury's in yet."

"The record company people that are consulting with software distributors feel that this is one of the many aspects which is going to be similar to the music business. And there has been some stardom for the videogame software writers — you know, even I am in awe of some of them."

"Some companies are now deliberately trying to make stars out of their software artists — but this process is still too disorganised and fragmentary. And although a lot of money is being spent in making stars, I still believe that the ones who write the best programs will be the ones who are going to be the stars and not the ones that the companies are focussing on."

CAN YOU BEAT OUR GREAT GAMES

We've got the biggest (and best) selection of games for the Commodore 64. We think they're unbeatable



MORE THAN GAMES...

Our FREE catalogue lists dozens of programs for your Commodore 64 to help you run your business, write programs, or just enjoy yourself. We've been producing top quality software since 1978. So if you want the best, just remember our name...

ARCADE GAMES	
(machine code)	
STIX	
CRAZY KONG	£8.95
KAKTUS	£8.95
WILDFIRE	£8.95
3D GLOOPER	£8.95
MANGROVE	£6.95
TANK ATAK	£8.95
FORESTLAND	£8.95
ADVENTURE GAMES	
STREETS OF LONDON	£9.95
Goblin Towers	£9.95
COSMIC CAPERS	£7.95
CRACKS OF FIRE	£7.95
FORESTLAND	£7.95
FANTASY GAMES	
HALLS OF DEATH	£8.95
LORD OF THE BALROGS	£6.95
Post free	

SUPERSOFT

SUPERSOFT, Winchester House, Canning Road, Wealdstone, Harrow, Middlesex, HA3 7SJ Telephone: 01-861 1166

HAVE YOU BEEN INVOLVED IN A MYSTERIOUS ADVENTURE RECENTLY?

If so, it is quite probable that you are presently suffering from TIS, more commonly known as Total Involvement Syndrome.

TIS manifests itself in a number of ways, one of the most dramatic symptoms being a victim's complete inability to feel at ease in the world of reality. Other symptoms include insomnia, a desperate need to play a Mysterious Adventure, and an overwhelming sense of acute enjoyment.

Experts believe that TIS is usually contracted as a result of prolonged exposure to Mysterious Adventures, this is commonly caused by owning any of the following Home Computers:-

48K SPECTRUM, BBC MODEL A OR B, TRS80, COLOUR GENIE, ATARI 400/800, COMMODORE 64, DRAGON 32, 16K ZX81, LYNX etc.

When questioned about this epidemic, a representative of DIGITAL FANTASIA, a company who are actively involved in research and development work on Mysterious Adventures said, "There is probably no cure for TIS other than mains failure, faulty RAM chips etc. which can be at best only a Temporary solution". "In the absence of a more permanent cure, I would advise TIS sufferers to submit to the Syndrome and obtain Mysterious Adventures from any sources available to them". "TIS is highly contagious and in view of the current Worldwide Epidemic, I would say enjoy it while you can, resistance is futile".

If you have a BBC Computer or a 48K SPECTRUM, you can obtain Mysterious Adventures direct from DIGITAL FANTASIA in any of the following dosages:-

- | | | |
|----------------------------|---------------------------|--------------------------|
| 1) THE GOLDEN BATON | 5) ESCAPE FROM PULSAR 7 | 8) THE WIZARD AKYRZ |
| 2) THE TIME MACHINE | 6) CIRCUS | 9) PERSEUS AND ANDROMEDA |
| 3) ARROW OF DEATH (PART 1) | 7) FEASIBILITY EXPERIMENT | 10) TEN LITTLE INDIANS |
| 4) ARROW OF DEATH (PART 2) | | |

Each Dose costs £9.95 including V.A.T. and Postage. Excellent quantity Discounts are available for Pushers.

D.F. MENTAL HEALTH WARNINGS. MYSTERIOUS ADVENTURES CAN SERIOUSLY DAMAGE YOUR SENSE OF REALITY.



SEND CHEQUE OR P.O. TO:

DIGITAL FANTASIA

24 NORBRECK ROAD, NORBRECK,
BLACKPOOL, LANCs. FY5 1RP.
TEL. (0253) 591402

NEW
UNEXPANDED
VIC 20
GAMES DESIGNER

MAKE GREAT GAMES....

Create your own amazing games with
Galactics unique **GAMES DESIGNER** cassette
for the unexpanded VIC 20, only **£9.50**
including post and packing

ONLY
£9.50
inc. p.p.

***No Programming experience Needed ***

With the **GAMES DESIGNER** you make your own machine code games.
You can design all the Graphics, Screen layouts, Theme tunes, Explosions,
Sound effects, Player speed, Alien speed, Skill level, Personalised game
credits, Scoring values, Keys used, Number of lives, Intelligence of aliens,
— what's more no programming experience needed.

Also includes 3 sample games:-
KANGA, ZYON and KRAZY MAZE.

☐ PLEASE SEND ME A GAMES DESIGNER CASSETTE FOR
THE UNEXPANDED VIC 20 AT £9.50 inc. P.P.
MONEY BACK GUARANTEE

NAME _____

ADDRESS _____

☐ My Access No. is:

☐ I enclose a cheque/P.O.
for £9.50

Send to **GALACTIC SOFTWARE**
Unit 7, Larchfield Estate,
Dowlish Ford, Ilminster
Somerset TA19 0PF

Galactic Software

UNIT 7, LARCHFIELD ESTATE,
DOWLISH FORD, ILMINSTER

SOMERSET TA19 0PF
TEL: (04605) 5161



MAKE GREAT GAMES

- * No programming experience needed
- * Full colour Hi-Res Graphics
- * Make your own sound effects
- * Joystick or Keyboard control

ALL IN MACHINE CODE

- * Variable degree of difficulty
- * Make your own, Monsters, Moonscapes, Space Ships, Aliens, Kangaroos or Asteroids
- * Create your very own Games



For any SINCLAIR SPECTRUM

For one player. Get out of the Room of Death fast, by the single door in the north(top) wall. Why 'Room of Death'? Because not only is the floor full of bottomless oubliettes (that's 'pits' to you, dumb), but there are droids — as many as you want — coming to getcha. Blow them away or lure them over the oubliettes to survive.

HINT: Keep your nerve and wait as long as possible — the droids will conglomerate and can be obliterated ('zapped').



CONTROLS

Cursor keys move you.
0 fires your pistol.

VARIABLES

x,y	your co-ords.
x(),y()	droids' co-ords.
dl()	if 1 then droid is an ex-droid.
bu	bullets.
dr	number of droids.
m	move number.
p	direction you last moved
— compulsory angle of fire.	

ILLUSTRATION:
ROBIN SMITH

ESCAPE

by ANTONY TRENKER

```

1 REM COPYRIGHT ©
  ANTONY TRENKER
  1983
3 BORDER 0: PAPER 1: INK 7
4 CLS
5 GO SUB 9000
10 FOR b=y+5 TO 1+5 STEP 5
12 PLOT OVER 1;x,b: DRAW 0,2
13 BEEP .001,30
14 IF POINT (x,b)=0 THEN LET a
  =x: GO TO 50
15 PLOT INVERSE 1;x,b: DRAW IN
  VERSE 1;-2,0
16 NEXT b
19 RETURN
20 FOR a=x+5 TO 245 STEP 5
22 PLOT OVER 1;a,y: DRAW 2,0
23 BEEP .001,30
24 IF POINT (a,y)=0 THEN LET b
  =y: GO TO 50
25 PLOT INVERSE 1;a,y: DRAW IN
  VERSE 1;-2,0
28 NEXT a
29 RETURN
30 FOR b=y-5 TO 10 STEP -5
32 PLOT OVER 1;x,b: DRAW 0,-2
33 BEEP .001,30
34 IF POINT (x,b)=0 THEN LET a
  =x: GO TO 50
35 PLOT INVERSE 1;x,b: DRAW IN
  VERSE 1;-2,0
38 NEXT b
39 RETURN
40 FOR a=x-5 TO 10 STEP -5
42 PLOT OVER 1;a,y: DRAW -2,0
43 BEEP .001,30
44 IF POINT (a,y)=0 THEN LET b
  =y: GO TO 50
45 PLOT INVERSE 1;a,y: DRAW IN
  VERSE 1;-2,0
48 NEXT a
49 RETURN
50 FOR f=1 TO n
52 IF a=x(f) THEN IF b=y(f) TH
  EN LET d(f)=1: LET dr=dr-1: BEEP
  -2,-40: FOR a=x(f)-2 TO x(f)+2:
  PLOT INVERSE 1;a,y(f)-2: DRAW I
  NVERSE 1;0,4: NEXT a: RETURN
53 NEXT f
58 STOP
100 IF INKEY$="S" THEN IF x>10
  THEN LET p=40: FOR a=x TO x-10 S
  TEP -2: GO SUB 800: LET x=a: GO
  SUB 800: NEXT a: GO TO 200
110 IF INKEY$="3" THEN IF x<240
  THEN LET p=20: FOR a=x TO x+240
  STEP 2: GO SUB 800: LET x=a: GO
  SUB 800: NEXT a: GO TO 200
120 IF INKEY$="7" THEN IF y<150
  THEN LET p=10: FOR a=y TO y+150
  STEP 2: GO SUB 800: LET y=a: GO
  SUB 800: NEXT a: GO TO 200
130 IF INKEY$="6" THEN IF y>10
  THEN LET p=30: FOR a=y TO y-10 S
  TEP -2: GO SUB 800: LET y=a: GO
  SUB 800: NEXT a: GO TO 200
140 IF INKEY$="0" THEN IF bu>0
  THEN LET bu=bu-1: GO SUB p: GO T
  O 200
150 IF x=130 THEN IF y=150 THEN
  IF INKEY$="7" THEN GO TO 600
190 GO TO 100
200 LET m=a+1
205 FOR f=1 TO n
210 IF d(f)=1 THEN GO TO 270
215 GO SUB 900
220 IF x(f)<x THEN IF POINT (x(
  f)+5,y(f))=0 THEN LET x(f)=x(f)+
  5
230 IF x(f)>x THEN IF POINT (x(
  f)-5,y(f))=0 THEN LET x(f)=x(f)-
  5
240 IF y(f)>y THEN IF POINT (x(
  f),y(f)-5)=0 THEN LET y(f)=y(f)-
  5
250 IF y(f)<y THEN IF POINT (x(
  f),y(f)+5)=0 THEN LET y(f)=y(f)+
  5
255 GO SUB 900
260 IF x(f)<x+6 THEN IF x(f)>x-
  5 THEN GO TO 700
265 IF y(f)<y+6 THEN IF y(f)>y-
  5 THEN GO TO 700
262 IF POINT (x(f),y(f)-2)=0 TH
  EN LET d(f)=1: LET dr=dr-1: BEEP
  -2,-30: GO SUB 900: FOR a=50 TO
  20 STEP -1: BEEP .001,a: NEXT a

```

```

270 NEXT f
280 BORDER 1
282 FOR a=30 TO 50
284 BEEP .0004,a
286 NEXT a
288 BORDER 0
300 PRINT AT 0,1:"BULLETS "; FL
  ASH 1: INK 3;" ";bu;" "; FL
310 PRINT AT 1,1:"DROIDS "; FL
  ASH 1: INK 4;" ";dr;" "; FL
330 PRINT AT 0,18:"HOLES "; F
  LASH 1: INK 5;" ";INT (n/3);" "; F
340 PRINT AT 1,18:"MOVES "; F
  LASH 1: INK 4;" ";m;" "; F
390 GO TO 100
610 BORDER 2
610 PRINT AT 3,9:"SCORE = ";INT
  (10*(dr+1)*(20/m)+5*(bu+1))+200
620 PRINT #1: FLASH 1;"
  Y O U W O N .
630 PRINT REM 16 dashes "....."
  play again "Press any key to
  go to 750"
700 BEEP 1,-30
710 PRINT #1: FLASH 1: INK 4;"
  Y O U W O N I E D
715 PRINT AT 3,9:"SCORE = ";INT
  (10*(dr+1)*(20/m)+5*(bu+1))+200
720 PRINT #1:"Press any key to
  play again"
750 IF INKEY$="" THEN PAUSE 1:
  BORDER 1: BORDER 0: BORDER 0: BO
  RDER 0: BORDER 4: GO TO 750
790 RUN
800 INK 5: BEEP .0001,65
801 PLOT OVER 1;x-2,y-2
802 DRAW OVER 1;4,0
810 PLOT OVER 1;x,y-2
812 DRAW OVER 1;x,0
820 PLOT OVER 1;x-2,y
822 DRAW OVER 1;1,1
824 DRAW OVER 1;x+2,y
830 PLOT OVER 1;0,1
832 DRAW OVER 1;x+2,y
834 DRAW OVER 1;-1,1
840 INK 7
850 RETURN
900 PLOT OVER 1;x(f)-2,y(f)
902 DRAW OVER 1;4,0
904 DRAW OVER 1;-1,1
906 DRAW OVER 1;0,1
908 DRAW OVER 1;-2,0
910 DRAW OVER 1;0,-1
920 PLOT OVER 1;x(f)-1,y(f)-2
922 DRAW OVER 1;2,0
924 DRAW OVER 1;-1,1
930 RETURN
9000 REM set up
9010 LET x=INT (RND*23)+10+10
9015 LET m=0
9020 LET p=20
9030 LET p=10
9050 INPUT "NUMBER OF DROIDS ";n
9055 IF n>40 OR n<1 THEN BEEP .5
  : GO TO 9050
9057 LET dr=n
9060 DIM x(n): DIM y(n): DIM d(n)
9070 LET bu=INT (n/4)
9080 FOR d=0 TO 20
9082 PRINT AT d,0: INK 0;"
9084 NEXT d
9090 PRINT AT 2,0: INK 0;" "; IN
  K 5;"
9092 PRINT AT 21,0: INK 0;"
9100 FOR f=1 TO n
9110 LET x(f)=INT (RND*47)+5+10
9120 LET y(f)=INT (RND*28)+5+10
9130 GO SUB 900
9140 BEEP .01,30
9150 NEXT f
9200 FOR f=1 TO n/3
9210 LET a=INT (RND*23)+10+10
9220 LET b=INT (RND*14)+10+10
9240 CIRCLE INK 5;a,b,2
9250 NEXT f
9300 GO SUB 800
9910 GO TO 300

```



WARNING: Reading this page without prior knowledge of simple machine code principles may — nay, will — damage your health

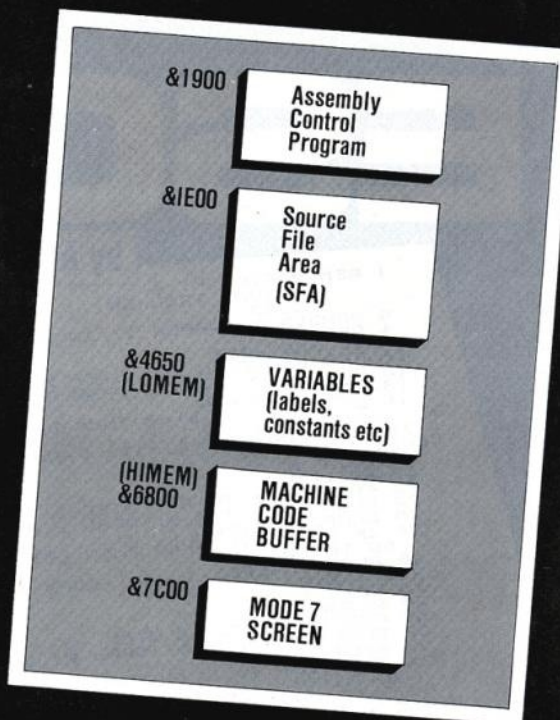
Goad that code the 6502 way!

In the first of a three-part series, BIG K Technical Editor **ANDY GREEN** lays down the lowdown on how to write smoo-oo-ooth machine code routines for the BBC and other 6502-driven micros.



DO YOU UNDERSTAND ALL THIS HI-TECH WIZARDRY, COSMO?

SHUT UP AND DEAL!



THIS SERIES of articles describes how to use a BBC computer to write machine code (especially games!) for either the BBC itself, the Oric-1 or a Commodore 64.

Yeah, they're all 6502 machines, reason being that the BBC assembler only works on 6502 code. Besides, the 6502 is a great chip, its code being faster, neater and in the long run, more compact than Z80 (that should stir up all the spectrum programmers out there... vive la 6502!).

The bad news is that you've got to have a disc drive, for reasons of speed and flexibility, as well as OS 1.2 and BASIC II. Both the latter ROMs are now available (at least) from most BBC stockists off the shelf.

With the BBC, a disc drive and (if you need it) a target micro you can write smooth, professional games. The first two articles in this series will deal with setting up your system, and the rest of the series will be devoted to letting slip trade secrets on how to get smooth, fast graphics.

Tricky Transference

How this system works... Assembly code is entered and edited solely on the BBC. When the time comes to assemble, the excellent built-in BBC assembler is used. The resultant machine code is first put in a buffer, then (unless you're assembling for the BBC itself) dumped into the memory of the target micro (in this case a Commodore 64 or Oric). The transferring of the machine code is the tricky bit, one that will be covered in due course. Meanwhile I'll get on with explaining just how the assembly system is going to work.



FIG. 2

```

>*LIST !BOOT
1 *KEY 0 *FX4,0;MODE7:IM
2 *KEY 1 LIST:IM:O
3 *KEY 2 RUN:IM
4 *KEY 3 GOTO30000:IM
5 *KEY 4 *LOAD OBJ 1900:IM*TAPE:IMP%=&A0
1:COPT2:LDY#0;.R1 LDA(&70),Y:STA(&72),Y:1
NY:BNER1:INC&71:INC&73:LDA&71:CMF#&7C:BNE
R1:RTS:J:IM!&70=&E051900:CALL&A01:MCALL&E0
5:IM
6 *KEY 8 PAGE=&1E00:IM
7 *KEY 9 PAGE=&1900:IM
8 *KEY 10 OLD:IM*FX12,2:IM
9 MODE7:P." Greenie's Assembling Syste
m says 'Hi!'..."TAB(15);CHR#141;CHR#131;"E
XAMPLE"TAB(15);CHR#141;CHR#131;"EXAMPLE"
;TAB(0,20);: *LOAD A 1900

```

Listing of !BOOT file. Note you should leave out the *KEY 4 definition if you are writing for Commodore 64/ORIC

The BBC's memory is subdivided into four parts, plus the Mode 7 screen memory, as shown in Fig(1). To get over the lack of memory, your assembly code is stored as one or more BASIC files on a disc, each of which are swapped into the Source File Area (SFA), from &1E00 to LOMEM, as the Control program needs them. The Control program starts at &1900, so that it isn't overwritten by the swapping, and you can flip between the Control program and the last program to be loaded into the SFA by using function keys f9 and f8 respectively.

Separate Files

On Delta 4, for example, there was a separate file for each of the four game parts, and another couple to look after the title page and high scores. If after assembly I found a bug (not too unusual an occurrence) in the 'Invaders' part I would hit f8 to make sure I was in the SFA, then load in the INVADE (geddit?) file, make any changes using BASIC and save the file back to disc using f3 (see later) — NOTE THAT YOU MUST SAVE THE FILE TO DISK BEFORE ASSEMBLING!! This is because the Control program reloads each program as it needs it! I could then reassemble by pressing f9 to get back to the Control program and f2 to RUN the control program.

The string at line 310 in the Control program, Fig(3) and (4), contains the names of the files that the assembler is to, er, assemble, in order. Each filename must be six characters long and preceded by a space; although the last filename consists of just an asterisk. Zero page labels, i.e., labels with a value of less than 256, must be defined before they are used; so it may be a good idea to have a first file that contains all the label definitions, together with any static (read-only) lookup tables you may need in your program (e.g., a table containing the address of the first byte on each line

of the screen, which wouldn't change throughout the program).

Each of the source files is only allowed to get so large, about 9K, before you have to start another file. As you can see from Fig(1), this is because the variables need some space too! With extremely large assembly programs, there may be too many variables to fit in the space allocated between LOMEM and HIMEM. Don't be too concerned, however, since THEM contains 20K of finished machine code and data tables (about 70K of source — gasp) and didn't have any trouble. In fact, you're more likely to run out of disc space than variable space, if careful with the length of individual files, and keep the variable names short and to the point.

My Favourites

To set up a disc, format it, and *BUILD a !BOOT file as in Fig(2): You'll notice this contains function key definitions for f0 to f3 as well as f8 and f9. f0, f1 and f2 are simply my favourite keys for clearing the screen, listing the program in page mode and running the program, and you can easily change these to your own favourites.

However, the definition for f3 should be included on one of the function keys as this performs as 'Auto Save' on source files. It clears the screen, prints up the name of the file and waits. Type an upper case 'Y' and [Return] to save the file. Anything else and it goes back to the BASIC prompt. This is a — sigh — recent addition, included after typing SAVE "MISSIL" at two o'clock in the morning when meaning to save INVADE. This led to two files containing the INVADE



FIG. 3

```

>LIST
10REM "Control for BBC — GRUN 84
20HIMEM=&67FF:LOMEM=&4650:CLR:??FE6
2=&FF:??FE60=0:LOMEM=&4650
3000 ERROR CLOSE#0:PRINT"":REPORT:PRI
NT;" at line ";ERL:END
40MODE7:PRINT""Now assembling:";Y% = 4
50P%=&E05:Z% = 0:W% = 1
60FILE$=" EXAMPL*"
70A$=MID$(FILE$,W%,7):IFA$="*"THEN110
80A$=RIGHT$(A$,6):PRINTTAB(0,2+W%/7);
A$;" Pass ";-(Y%>4)+1:W%=W%+7:OSCLI "L
OAD "+A$+" 1E00":O%=&6800:PAGE=&1E00:GOT
O10
90PRINTTAB(30,0);~O%:IFY%=6THENPRINTT
AB(15,1+W%/7);"Sending";:??C00=H%:!&C01=
&6800:!!&C05=(O%-&6800):!!&C09=Z%:X%=0:Y%
=&C:A%=1:CALL&FFD1:Z%=Z%+(O%-&6800):GOTO7
0
100GOTO70
110IFY%=4THENY%=6:H%=OPENOUT("OBJ"):GO
TO50
120CLOSE#H%:PRINTTAB(0,20);"Done":END

```

Listing of BBC control program. Note you must use same line numbers

source code and a heart-breaking lack of a 5K file called MISSIL. After the red mist had cleared from my eyes (and that was no VDU19,0,1,0,0,0 !), I created f3 and swore that I'd never 'SAVE' a source file again (and I swore some more anyway, just for the hell of it).

If you are writing programs that will run on the BBC itself then also define f4, else leave it out. The use of this key is explained later. After creating the IBOOT file, type *OPT4,3 so the disc knows it must auto-boot with shift-BREAK.

Now you must type in the Control program, but first of all decide which version you need. If you are going to write programs for the BBC itself, then type in the listing in Fig (3). If you intend to write for the Oric or Commodore 64 then type in the listing in Fig (4). Once you've typed it in, save it to disk with the filename "A".

The hardware details of how to link up the Commodore 64 and the Oric to the Beeb will appear next month (don't worry, the hardware is really simple), but to round off this month's section I've got details of the standard format for each source file for you.

Include REM

Each source file starts at line 10 (see Fig (5)) with a REM statement and the name of the program. This is from where each file is executed by the Control program, so it must be included. Line 100 indicates the start of the assembly code, which can go on until line 9998. Line 9999 indicates that we're back in BASIC and returns to the Control program. Line 30000 is used with f3 and the filename inside the OSCLI statement MUST BE THE NAME OF THE FILE!!! (Since this is the filename used with the auto-save function.) It appears twice, once in the PRINT statement and once in the OSCLI statement. Be sure to set both correctly.

(For those who haven't met it before, the OSCLI command on BASIC II sends a string to the Command Line Interpreter. The string can include Basic expressions, eg CHS\$(42), and should be formatted as if it were a * command, e.g. as OSCLI ("FX12,"+STR\$(A%)) would, if A% had the value 2 to the equivalent of *FX12,2.)

CALL SYS

You can use Key f4 to execute the object code after assembly, if the code is designed for the BBC, or use CALL or SYS on the Oric or Com 64.

Over the next few months we'll take apart a game and cut it into chunks, one chunk a month. Next month I'll have an overview of the game, details on cables to connect up your Beeb and programs for the Com 64 and Oric to accept the object code from the BBC. Each part of the game will appear in three listings, one for BBC, one for C64 and one for Oric.

MORE NEXT MONTH

FIG.4

```
>LIST
15REM "Control for C64/Oric - GRUN 84
20HIMEM=&67FF:LOMEM=&4650: CLEAR: ?&FE6
2=&FF: ?&FE60=0:LOMEM=&4650
25FOR Y%=0 TO 3 STEP 2: F%=&A01: COPTY%
30.TROUT SEI: LDA#&FF: STA&FE62: LDA&FE6
C: ORA#16: STA&FE6C: LDA&FE6D: AND#239: STA&F
E6D: LDX#10
35.X0 LDA#0: JSR SEND: DEX: BNE X0: LDA#&
FF: JSR SEND: LDA&70: JSR SEND: LDA&71: JSR SEN
D: LDA&72: JSR SEND: LDA&73: JSR SEND: LDY#0
40.X1 LDA(&74),Y: JSR SEND: INC&74: BNEP%
+4: INC&75: INC&70: BNE X2: INC&71
45.X2 LDA&71: CMP&73: BNE X1: LDA&70: CMP
&72: BNE X1: LDA#0: JSR SEND: CLI: RTS
50.SEND PHA
55.X3 LDA&FE6D: AND#16: BEQ X3: LDA&FE6D
: AND#239: STA&FE6D: PLA: STA &FE60: RTS
60: I: NEXT
65MODE7: PRINT "Now assembling": Y%=4
70P%=&600: L%=P%: W%=1
75FILE$=" EXAMPL*"
80A$=MID$(FILE$,W%,7): IFA$="*" THEN 100
85A$=RIGHT$(A$,6): PRINT TAB(0,2+W%/7);
A$; " Pass "; -(Y%<4)+1; W%=W%+7: OSCLI "L
OAD "+A$+" 1E00": O%=&6800: PAGE=&1E00: GOT
015
90PRINT TAB(30,0); ~O%: IF Y%=6 THEN PRINTT
AB(15,1+W%/7); "Sending": ?&70=L% MOD 256:
?&71=L% DIV 256: ?&72=(P% AND 255): ?&73=(P% DI
V 255): ?&74=0: ?&75=&68: L%=P%: CALL TROUT: GO
TO 80
95GOTO 80
100IF Y%=4 THEN Y%=6: GOTO 70
105A%=1: CALL SEND: PRINT TAB(0,20); "Done"
: END
```

Listing of Control program for C64/ORIC option

LIST

```
10REM EXAMPL
100COPTY%
110 .
120 .
130 .
140 .
150 .
160 .
99991: PAGE=&1900: GOTO 90
30000MODE7: B$="": INPUT "Save Examp1? : "
A$: IFA$<>"Y" THEN STOP ELSE PRINT CHR$30; ~P
AGE; ~TOP: FOR Y%=0 TO 7: B$=B$+CHR$(Y%?&7C00)
: NEXT: OSCLI ("SAVE EXAMPL "+LEFT$(B$,4)+"
"+RIGHT$(B$,4))
```

FIG.5

Example source file. Line 10,100,9999 and 30000 must be included. Lines 110-9998 contain your code.

Joystick and Interface

for Sinclair Spectrum with these features to give you endless hours of enjoyment.

1. Super positive response fire button.
2. Firm suction cups for stable one hand operation.
3. Snug fit hand moulded grip.
4. Additional fire button.
5. Extra long 4 ft lead.

The interface supplied with the Quick Shot (TM) has a two joysticks facility.

The first port simulates 6789 & 0 keys. The second port simulates in [31] command. It will run any Software.

1. Using keys 6, 7, 8, 9 and 0.
2. Having redefinable key function.
3. Using In [31] i.e. Kempston.
4. Any Software you write yourself.

A New Dimension in Spectrum Hardware



£22.95



£19.95

Keyboard for use with a Spectrum or ZX81

Our cased keyboard has 52 keys, 12 of which form a numeric pad. The 12 keys comprise 1-9 numeric plus full stop and shift keys, all in red, to distinguish from the main keyboard keys which are in grey, the keys contrast with the black case to form a very attractive unit. The case has been designed to take a ZX81 or Spectrum computer. 16K, 32K or 64K can also be fitted to the motherboard inside the case (81 model only). The case is also large enough for other add-ons like the power supply to be fitted, giving a very smart self-contained unit with which other add-ons e.g. printer etc. can still be used. Our ZX Professional keyboard offers more keys and features than any other model in its price range making it the best value keyboard available.

£45.00



Spectra-Sound

The so-called speaker in your Spectrum is really on a 'buzzer'. With the DK Tronics "SPECTRA SOUND" you can generate fully amplified sound through the speaker on your TV set. SPECTRA SOUND is a very simple but highly effective add-on. This means that you no longer have a faint beep but a highly amplified sound, which can be adjusted with the TV volume control. The SPECTRA SOUND fits compactly and neatly inside the Spectrum case and is connected by three small crocodile clips.

£9.95

dk'tronics

DK Tronics Ltd., Unit 6, Shire Hill Industrial Estate,
Saffron Walden, Essex CB11 3AQ.
Telephone: (0799) 26350 (24 hrs) 5 lines

Please send me @ £.....

Please send me @ £.....

Please add on £1.25 for post and packing.

I enclose cheque/PO payable to DK Tronics total £.....
or debit my Access/Barclaycard No.

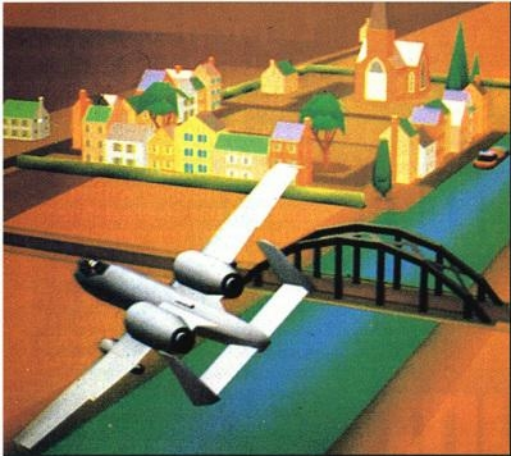
.....

Signature

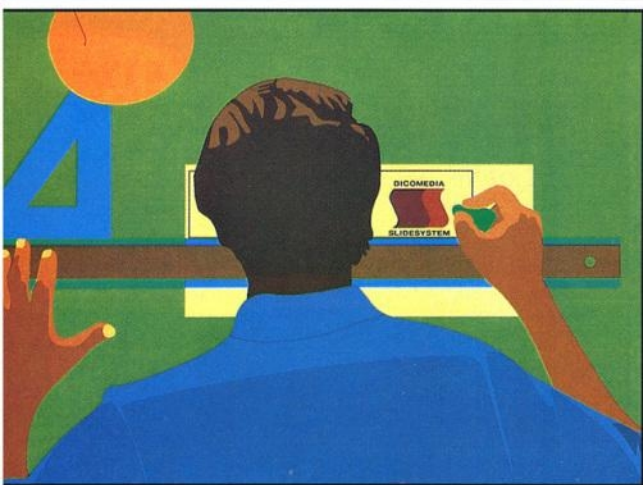
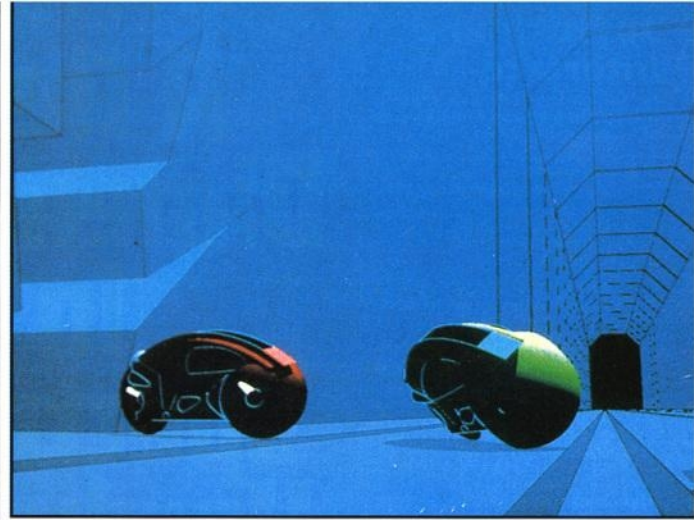
Name

Address

Send to: DK Tronics Ltd., Unit 6, Shire Hill Ind. Est., Saffron
Walden, Essex CB11 3AQ. Tel: (0799) 26350 (24 hrs) 5 lines



So-called "Solid Modelling" can produce some unearthly effects. From the Fairchild A-10 tank-busting plane of 7th TAC to the megabikes from Tron.



MIND

Three faces of the Art: (left) Mike Newman of Dicomed created Artist at Work on a D38+ Design Station. (Below left): Dance tuition, Apple style. (Below): A Ziggurat on Mars courtesy Digital Productions. Where does the stair lead? Where will it all end?

It's worth remembering, sometimes, when you're wrestling with a pixel grid or cursing your micro's rotten "high resolution", that in computer graphics — as much as anything else — you get what you pay for, and if you pay enough (it can run into six figures) what you get is a lot. Then, if you've got the skill and the time you can set about creating electronic imagery of the standard to be seen on these pages.

Solid modelling, ultra-high resolution, astonishing purpose-built equipment . . . all

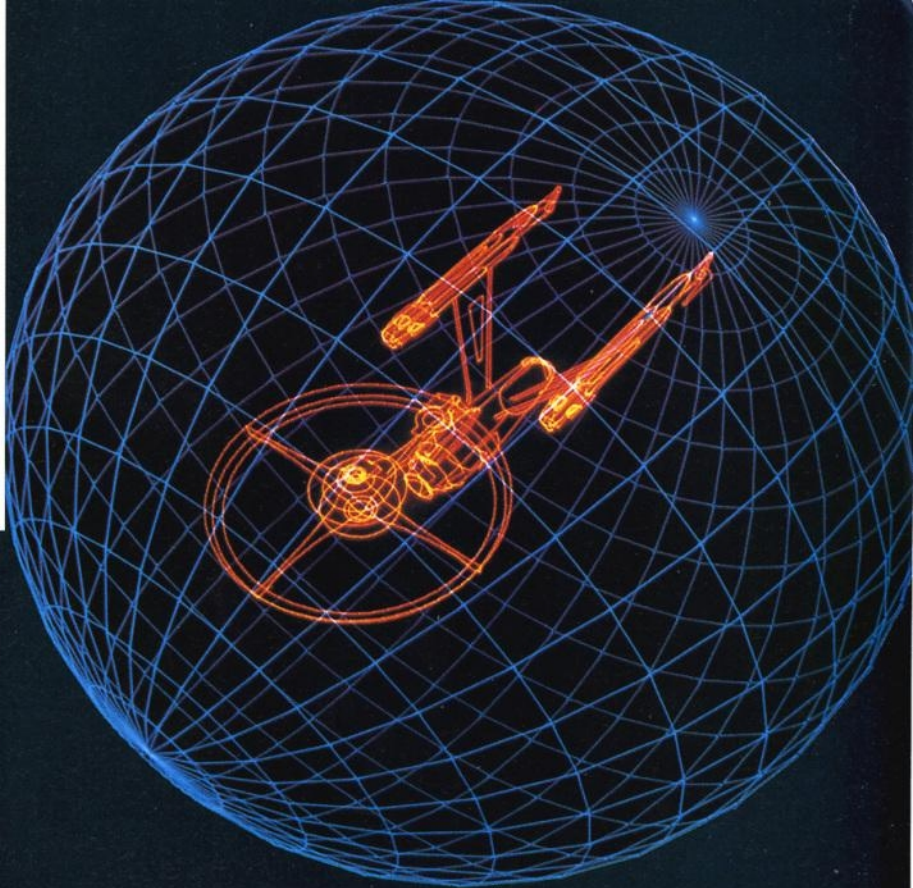




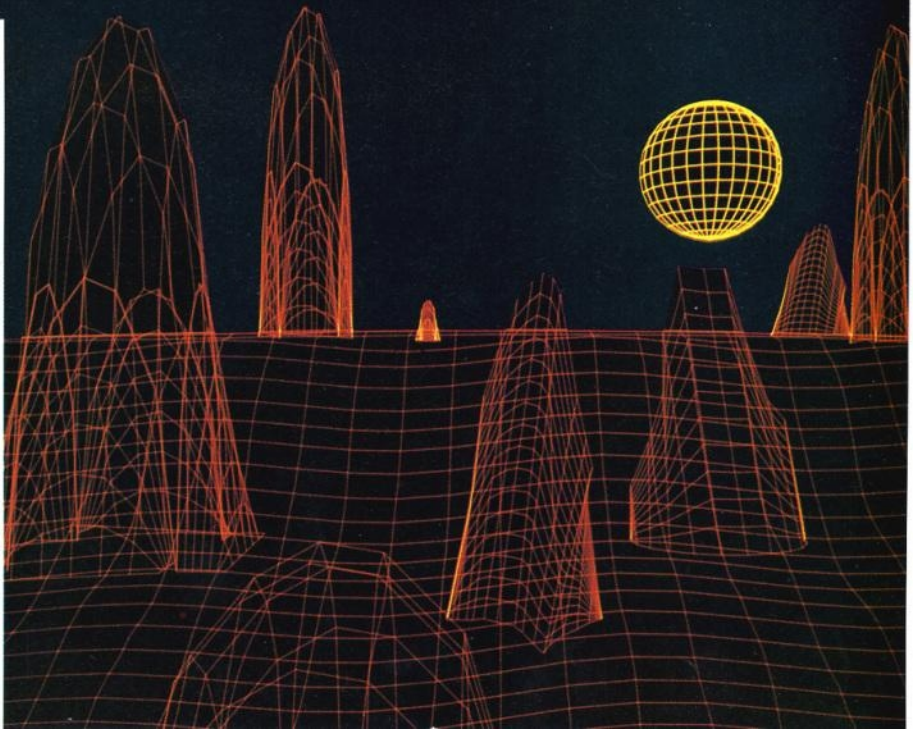
AMES

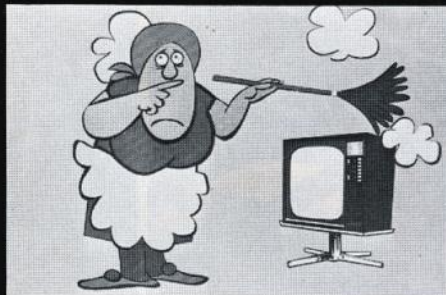
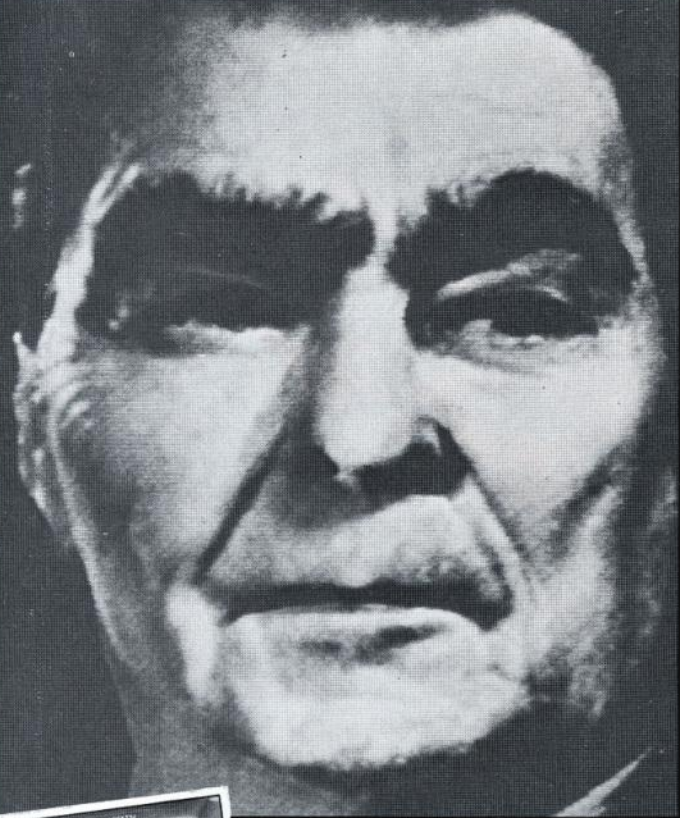
these, plus not a little professional expertise, are what it takes to produce the mind-boggling stuff now emerging from labs across the Western World.

PAUL WALTON has been looking through a new book (COMPUTER IMAGES: STATE OF THE ART by Joseph Deken). The state of this particular art, he reports, has never been higher . . .



"Now type CIRCLE and hope for the best" . . . One test of hi-res is the ability to draw curves without "stepping". How's this for starters?

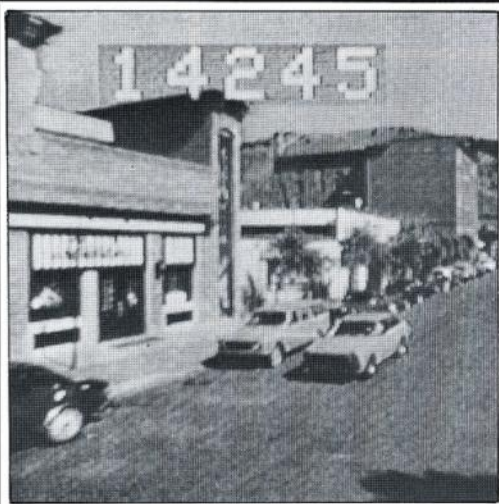




THE PRINCE OF ARMAGEDDON? The startling and evil image (left) was made by combining the faces of Reagan, Brezhnev, Mrs. Thatcher, Mitterrand and Deng Xiaoping in proportion to their national nuke stores. (Above): a cartoon comes as a relief.



All the illustrations of computer graphics on these pages are taken from **COMPUTER IMAGES: STATE OF THE ART** by Joseph Deken, excellent value at £9.95. Grateful thanks to Thames & Hudson, publishers, for permission to use these extracts.



GHOST TOWN? The image above is no photo, but a computer model of a western town. You can even enter the various buildings. You can even get out again.

The Still Life to end all Still Lives: the image (right) was first drawn, then filled, finally given a "real" patina... all by computer. Beats a bowl of nuts?



SQUARING UP

ATARI 800 (USA) VS. BBC Model B (GB)

In the first of a random series, BIG K breaks out the Wooden Spoons and issues them to two different contributors — who do their level best to make bad blood between owners of equivalent — but competing — microcomputers.

WEIGH-IN RESULTS

Atari 800

48K

Memory

6502

CPU

no

expandable?

yes

hi-res graphics?

11

No. of Modes

255;16 max

colours

proprietary

peripherals

1.8 mhz

clock speed

yes (predefined text window)

mix text/graphics?

via TV; 4 voices,
3 other
parameters,
5 octaves

sound

£200+

Typical price:

BBC Model B

32K

6502

yes

yes

7

8

anybody's

2.0 mhz

yes (user-definable)

internal; composite
4-voice parameters
using ENVELOPE
and SOUND stmts.

£399

IT'S NO BOOB TO BUY BEEB

says software designer **BERNARD TURNER**, opening strongly with a fact-filing pitch for Acorn's 'ever-expanding Wonder Widget in the slim buff case.

THE BBC 'B' micro has now been with us since December 1981. In that short time Acorn's best shot (so far) has created a tremendous reputation as the personal micro.

Why is this so?

To begin with, the Beeb 'B' is part of a system — designed from the outset by Acorn with this major advantage in mind. It therefore benefits from some enormous pros and pluses, primarily apparent in the 'future compatibility' concept embodied in *The Tube* — a device to allow two different and separate microprocessors to communicate at very high speeds.

In fact, Acorn plans to release, in all, three different microprocessors: a) another

6502; b) a Z80, and c) the new National Semiconductor 16032 chip.

Acorn's choice of chips (say it fast) has — to my mind — been wise. Very wise. Why?

1) Compatibility with Acorn's existing (6502) software. 2) adoption of the 8-bit

industry standard with the use of Z80 cp/m; 3) most importantly, a very powerful (arguably the best) 16-plus-bit chip in the form of the 16032 — which I feel is one chip we'll all be hearing a lot more of.

Akin to *The Tube*, is a very

important piece of software called the Machine Operating System (MOS). The MOS's purpose is to look after the hardware — practical thinking on Acorn's part when they devised it, as they have therefore implemented 'Big Machine' philosophies in a micro. The direct benefits are super easy access to hardware through documented MOS subroutines, and — not to be sniffed at — near-zero redundancy when the machine is upgraded. This also allows languages and utilities to be run with (relative) ease.

Then there's BBC BASIC — probably the best on any micro today. (Not only is it good — it's fast. Check the benchmarks!) Also ace — the built-in Assembler, and, of course, the support from suppliers such as Acornsoft, A&F, Bug-byte and Program Power (to name but a few). If you're looking for good stuff you don't have to look far and when you dig into your pocket, it generally isn't so deep as with some other suppliers, targeted on another well-known machine whose name begins with an 'A' — oh, all right — Atari.

Yes, the BBC 'B' has some



Big Hand for the

If you think what's happened in the last two years has been pretty good, you ain't seen nuthin' yet.
Future Shock by PAUL WALTON

TAKE A second look at the personal microcomputer snuggling up to a million TV screens. These are the cells, the primordial digital glop from which the ultimate machine will — one day — evolve.

Future Shock, a hymn to tomorrow written by American star-gazer Alvin Toffler, describes a world in which the machine becomes an invisible part of the scenery; existing just as the power to

process ideas, supplying the electricity which drives dreams.

A hand — well, it's a start — has already evolved. In Japan, as it happens. Hitachi, the Japanese industrial giant, has built the machine's robot hand which is able to flex unconstrained by its metal skin. Its eyes and ears are everywhere, gobbling up and digitising the flavour of the world's cultures. It began to talk in the last decade. It is starting to walk in this decade. It is expected to

begin to "think" before the year 2000. After that? Well, check off a list of human bio-functions and form your own ideas.

Chips are now passé, as relatively unimportant in their way as the plug on your TV. Programming is becoming staid, as this generation of software and systems fall victim to the Intelligent Knowledge-based or "Expert" System. All sense of the personal microcomputer's size and shape is gently being tipped out of the window and — to mix metaphors — back into the Pre-Cambrian sludge.

pretty nifty specs. Most people have an interest in graphics, right? Right. In the case of the Beeb they have every reason to be. You have eight graphics modes, from resolution 640x256 (80 characters x 30) using 20K of memory (Mode 0), to the 80x75 (40 characters x 25) using 1K of RAM in Teletext Mode (7). Colour is dependent on screen mode (2 to 8). In Mode 2 you get eight (not 16 as claimed — the 'extra' eight are merely flashing opposites of the first set.)

Sound? Excellent with speech synthesis now available. Tape backup? Any ordinary domestic tape recorder will do (I think). This goes for all other peripherals, too — a real and rare bonus (get out of that, Atari, — and you, too, Commodore!).

Then there's the programmeable function keys. To use them is to love them. 'Nuff said.

OK, you say, 'Where's the catch?' To be honest there is a deficiency: — to wit, its notorious lack of usable RAM. This can be overcome in a number of ways (buy a second processor, get paged RAM, or use the paged ROM facility). When Acorn bring out the successor to the BBC 'B' I hope they remember this, though.

So, to wind up: the Acorn/BBC 'B' model is great. It's the best. It's highly expandable and has been planned from the start as the keystone or master component of a whole system. What more could anyone ask?

Well, since you mention it...

THE DREADNOUGHT FROM SILICON VALLEY

TONY TYLER puts the case for the rough, tough, powerful, versatile and heavily underrated ATARI 800.

IT'S SQUAT and ugly and faintly bulbous — just concave enough to ensure that the manual keeps sliding off into your Tizer. It's gritty to the touch, and sprayed the colour of a dog-tired US Marine who's spent the last three nights in a wet foxhole. It's as American as a '55 Pontiac but

not half so glamorous. The disc drive looks like a Baby Belling cooker — and makes as much noise as a clapped-out fridge in summer. It's unexpandable, and its annoying, in-house-only interface design means that you have zero choice in major peripherals. When launched four or so years ago it was an advanced design; but now, frankly, it's looking pretty long in the tooth.

Then why do I love it so?

You always have a special place in your heart for your first... micro (what did you think I was going to say?) — and me, I'm no exception. The Atari 800 was my first micro; and while I freely acknowledge that there's 'better' hardware around, when I first laid claw — 18 months ago — on the packing polystyrene, this was not so obviously the case. Who competed? The BBC? Maybe — but it was, and still is, a lot dearer. The Commodore 64 was not then in UK shops, and the only other competitor, the Apple II, was (and still is) a pricier package by far.

Now that the Atari 800 has come sharply down in price — so much so that you can often strike your own bargain — I suggest that it's a better bargain than ever before.

OK. First, casing and key-

board. This baby looks muscle-bound and is. Oaf that I am, I once left it switched on for nearly three days. The 800 shrugged this off as of no account. Yes, the pins in the i/o terminals are a trifle on the frail side, perhaps (untold story here), but unless you're crazed with impatience (as I was) it oughtn't to be a problem.

Solid Colours

The peripherals work. So what if you need a separate (but identical) transformer for most of them? Who cares if it won't expand? With the obese but tough and versatile 800 you've got 37½ Ks (officially 48) to play with in freely available RAM (more if you disable the o/s), and eleven (count 'em) text/graphics modes. You've a palette of rich, solid, unflickery colours to dip into — the full 8-bit (255) string, in fact — and in some modes you can put 16 of these on the screen at any one time. Best resolution is only marginally less high than the Beeb's Mode 1. You can have text in all modes except the last three, either wholly or in a predefined window below the graphics area. The four-voice SOUND is excellent, and less cumbersome to program than

Little Tin Guy...

The chip which today brings electronic warriors to your screen will one day bring the *direct experience* of them to your mind. Flat-screen TV mirrors many times the size of a TV set — which hang on the wall — will take a series of images and represent them as pure light rather than separate particles of energy exploding on to a sensitive surface as individual blips. A broad band of digital information, a channel, then allows the computer's output more closely to resemble or mimic the natural input.

Ultimate Game

An Israeli scientist has taught deaf people, including himself, to hear perfectly, and to be able to hold normal conversations. He did it by programming a tiny chip to compress sound waves. The broad channel of digital noughts and ones is then tapped out physically on a deaf person's bones. For human beings experience

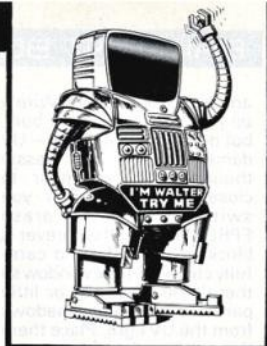
sounds as *physical* sensations as well as aural ones.

The ultimate video game will have bombs exploding *inside* your head! Ouch! On the way? Visual images, sound, perhaps even the "feelings" and "emotions" being processed by the machine will be delivered directly to the appropriate part of your brain, of your neural map, and so directly experienced. The ultimate on-line process.

Hail Tech

A machine is being built — again, today — which will be able to respond to verbal human commands. The Japanese "Fifth Generation" project at their ICOT labs is using chips just as if they were no more than the simplest component.

A machine is being built — again, today — which will be able to respond to verbal human commands. The Japanese "Fifth Generation" project at their ICOT (not to be confused with



Epcot, Walt Disney's high-tech fun palace) labs is using chips just as if they were no more than the simplest component, as common-organ plugs to supply processing power.

The programs will process logical inferences, or ideas, rather than straight binary maths. A working prototype due out this year will handle 10 logical inferences per second (or LIPS, as they are known) — enough ideas, for example, to be able to describe what a computer or a TV set actually is. Their ultimate machine will run at many millions of LIPS, and be able to react very fast to questions.

The software which han-

dles ideas is not processed sequentially, as in today's personal microcomputers. It is ingested as huge chunks by giant parallel processors — all in one mouthful. The Japanese have the basic chip technology to build the system; what they lack — no surprise here — is the software to make it all happen.

OK. Having the machine to process ideas is one thing, but being able to input the right idea, the one you really wanted is another. American big business is backing the software capable of putting all those LIPS to use, leaving it to the Japanese to make the hardware.

Two brands of software are emerging, and will be the most expensive (and profitable) parts of the machine's system.

Intelligent

An Intelligent Knowledge Base stores everything which is known about a topic — one day, every scrap

Continued on next page

Acorn's. And the ROM/disc drive/cassette versatility is of exceptional value seeing that Atari's range of plug-in software is unparalleled in the micro world (so what if the second slot is as redundant as a sixth toe? It isn't doing any harm, is it?).

I hope Atari International will forgive me if I say that despite these qualities the 800 has never really caught on here — to use the suit-and-tie-ism, its 'user base' is distinctly on the undernourished side. (Not so in the US.) One early reason was the gannet-like greed of the starting price

— in the region of £500 for the micro alone, plus a particularly dreary, dense, hard-to-read and maths-obsessed BASIC manual. It tended, therefore, to fall between the Spectrum/ Vic end of the clientele and those loaded types who plumped straight off for Apple.

Less "Classy"

Like Apple, it was American. Not that there was, or is, any, er, nationalism involved; Sinclair just offered the best deal around, that was all (as

he still does). No, the initial lack of relative interest in the 800 was — irony coming up — the very quality and range of compatible ROM games software. This, plus the equally conspicuous lack of 'serious' applications, gave it a name as an excellent 'games machine' — the best — but a rather less 'classy' micro (overall) than the Beeb.

You can have ordinary text in Mode 0, larger, wider text in 1, still larger in 2. In 3, 4, 5, 6, 7 and 8 you can have four lines of Mode 0 text in a window at the bottom. Colour palettes are allotted sensibly, with two shades of one (of 255) in 0, three in 1 and 2, four in three (lo-res graphics mode), three in the (higher-res) 4, four in 5 (medium-res), two in 6, four in 7 (hi-res), two in the highest-resolution mode — 8 — and multiple choice of shade and colours in 9, 10 and 11 (medium-hi).

You can plug in up to four joysticks, paddles or other devices at once. A new, added bonus is the vast amount of gourmet sticks and controllers now available for the Atari/Commodore/Coleco-compatible sockets, most of them US-made. This enhances Atari's now-permanent image as makers of the best pure-game computer hard-

ware around.

All in all, the 800 is a proven, reliable, immensely strong, versatile machine with excellent graphics facilities and one of the easiest BASICs around. Its drawbacks — no PROCs, no lower-case commands, horrific circle and ellipse routines, a slow and memory-consuming fill (the unwieldy XIO statement), and the slowish clock speed — officially 1.8 mhz — are all livable with. While its range of advantages easily outweighs them.

Tarted Up

The 800 has now been 'superseded' — at least, such is the common opinion. Yet Atari's own new range — the 600XL and 800XL specifically — are little more than 400 and 800 guts tarted up with new cases and a HELP key. The bulbous original may be phasing 'out', but the innards — in their day, the most advanced available — live on. That's how advanced it was in the first place. These days it's a bargain as well.

Oh, and one last word. Absolutely none of the above applies to the 16K, flat-keyboard 400, which was, is and always will be — a Heap.



Big Hand for the Little Tin Guy...

of recorded information — in a kind of suspended animation. Just asking the right question, or even being in need of a particular item of information, will bring it tumbling out of the machine. This exists today, although it is relatively primitive, in the form of computer memory-storage called a database.

An Expert System, however, is more impertinent software — it doesn't wait to be asked! By picking a topic which the machine has some knowledge of, say the ancient art of computing, it prepares itself to hold a conversation with you. What is now being called the Man-machine Interface allows the machine to prompt you, to try and find out what it is you need to know. Again, these systems are in their infancy today.

Really wild style is not programming, but cloning a machine to be grown into a larger, more articulate system — a creature with its own life, but still basically a machine. Elementary biology and human frailty show us that we too are machines, albeit deluxe organic models. Biotechnology is already closely allied to computer technology and the resemblance is increasing.

How to Play

A VIDEO game, played in the year 2000, will probably go something like this.

Player One tells the machine what he wants to "play", or "do" and what he would like the "game", or "event" to be like. Physical "games" are played with robots, even humanoid figures with realistic skin, hair and teeth. Action can be stimulated directly in the brain, to conjure up any scene or any sensation. Images might also be presented conventionally — as a backup — on screens metres high, or as 3D laser holograms all around the body.

Players Two, Three and Four might share in this fantasy, and the whole experience will be saved for repetition. Or even sale.

And then, my friends, your wildest dreams will surely become the true source of every passing reality.

Think about it...

BRILLIANT BODGES Continued from page 77

and a clip for the bulb. Wire it up just like an ordinary bulb, but don't look at its light — UV damages eyes. No hassle though, just remember to close the case when you switch it on! To erase EPROMs, peel off whatever is blocking the light and carefully clean the little windows so there's no smearing or little particles to cause shadows from the UV light. Place them three inches from the source and let them have it for about fifteen minutes. Then check them using function A on the Programming Program for erasure. If it replies with 'non erasure at xxxx' then give the EPROM another couple of minutes under the UV source. Okay, so up to now we've

got the unit reading properly and the 21V is available to the ZIF whenever you hit the switch S1. Writing to an EPROM consists of setting up the appropriate address and data lines, and pulling pin 27, the PGM line, low for around 50ms. After 50ms have passed, you push the line back high, move to the next address and set up the next data value, then pull the PGM down for another 50ms and so on. During the 50ms PGM is low the EPROM accepts the 21V and 'burns' any zeros it finds in the data lines into the appropriate location. The 50ms has got to be fairly exact, as you can only go 5ms either side. Programming an 8K 2764 at twenty bytes a

second (50ms) will take around 7 minutes. This slow speed is a function of the EPROM, not the programming algorithm, which is written in machine code.

The program first asks you which sort of EPROM you want to program, 8 or 16K, then asks you to enable S1 and hit any key. It then begins the programming process. It sets up the address and data lines for each byte and uses the user VIA inside the BBC, IC69, as a timer for the 50ms. If you're using a BBC A with 16K of RAM added, then you'd better have the user VIA as well! (come to think of it, you can't run half of Acorn-soft's games without it, so you've probably got one

The driving Software for the BIG K Custom EPROM Programmer

Continued on page 99

```

LIST
OREM "Andy Green's EPROM PROGRAMMER
BIG K issue 1"
5010M% 500
10MODE7:GOSUB6000:CALL INIT:VDU23:8202:
0;0;0
20SF#CHRS1+CHRS2+CHRS3+CHRS4+CHRS5+CHRS6+CHRS7+CHRS8+CHRS9+CHRS10+CHRS11+CHRS12+CHRS13+CHRS14+CHRS15+CHRS16+CHRS17+CHRS18+CHRS19+CHRS20+CHRS21+CHRS22+CHRS23+CHRS24+CHRS25+CHRS26+CHRS27+CHRS28+CHRS29+CHRS30+CHRS31+CHRS32+CHRS33+CHRS34+CHRS35+CHRS36+CHRS37+CHRS38+CHRS39+CHRS40+CHRS41+CHRS42+CHRS43+CHRS44+CHRS45+CHRS46+CHRS47+CHRS48+CHRS49+CHRS50+CHRS51+CHRS52+CHRS53+CHRS54+CHRS55+CHRS56+CHRS57+CHRS58+CHRS59+CHRS60+CHRS61+CHRS62+CHRS63+CHRS64+CHRS65+CHRS66+CHRS67+CHRS68+CHRS69+CHRS70+CHRS71+CHRS72+CHRS73+CHRS74+CHRS75+CHRS76+CHRS77+CHRS78+CHRS79+CHRS80+CHRS81+CHRS82+CHRS83+CHRS84+CHRS85+CHRS86+CHRS87+CHRS88+CHRS89+CHRS90+CHRS91+CHRS92+CHRS93+CHRS94+CHRS95+CHRS96+CHRS97+CHRS98+CHRS99+CHRS100+CHRS101+CHRS102+CHRS103+CHRS104+CHRS105+CHRS106+CHRS107+CHRS108+CHRS109+CHRS110+CHRS111+CHRS112+CHRS113+CHRS114+CHRS115+CHRS116+CHRS117+CHRS118+CHRS119+CHRS120+CHRS121+CHRS122+CHRS123+CHRS124+CHRS125+CHRS126+CHRS127+CHRS128+CHRS129+CHRS130+CHRS131+CHRS132+CHRS133+CHRS134+CHRS135+CHRS136+CHRS137+CHRS138+CHRS139+CHRS140+CHRS141+CHRS142+CHRS143+CHRS144+CHRS145+CHRS146+CHRS147+CHRS148+CHRS149+CHRS150+CHRS151+CHRS152+CHRS153+CHRS154+CHRS155+CHRS156+CHRS157+CHRS158+CHRS159+CHRS160+CHRS161+CHRS162+CHRS163+CHRS164+CHRS165+CHRS166+CHRS167+CHRS168+CHRS169+CHRS170+CHRS171+CHRS172+CHRS173+CHRS174+CHRS175+CHRS176+CHRS177+CHRS178+CHRS179+CHRS180+CHRS181+CHRS182+CHRS183+CHRS184+CHRS185+CHRS186+CHRS187+CHRS188+CHRS189+CHRS190+CHRS191+CHRS192+CHRS193+CHRS194+CHRS195+CHRS196+CHRS197+CHRS198+CHRS199+CHRS200+CHRS201+CHRS202+CHRS203+CHRS204+CHRS205+CHRS206+CHRS207+CHRS208+CHRS209+CHRS210+CHRS211+CHRS212+CHRS213+CHRS214+CHRS215+CHRS216+CHRS217+CHRS218+CHRS219+CHRS220+CHRS221+CHRS222+CHRS223+CHRS224+CHRS225+CHRS226+CHRS227+CHRS228+CHRS229+CHRS230+CHRS231+CHRS232+CHRS233+CHRS234+CHRS235+CHRS236+CHRS237+CHRS238+CHRS239+CHRS240+CHRS241+CHRS242+CHRS243+CHRS244+CHRS245+CHRS246+CHRS247+CHRS248+CHRS249+CHRS250+CHRS251+CHRS252+CHRS253+CHRS254+CHRS255+CHRS256+CHRS257+CHRS258+CHRS259+CHRS260+CHRS261+CHRS262+CHRS263+CHRS264+CHRS265+CHRS266+CHRS267+CHRS268+CHRS269+CHRS270+CHRS271+CHRS272+CHRS273+CHRS274+CHRS275+CHRS276+CHRS277+CHRS278+CHRS279+CHRS280+CHRS281+CHRS282+CHRS283+CHRS284+CHRS285+CHRS286+CHRS287+CHRS288+CHRS289+CHRS290+CHRS291+CHRS292+CHRS293+CHRS294+CHRS295+CHRS296+CHRS297+CHRS298+CHRS299+CHRS300+CHRS301+CHRS302+CHRS303+CHRS304+CHRS305+CHRS306+CHRS307+CHRS308+CHRS309+CHRS310+CHRS311+CHRS312+CHRS313+CHRS314+CHRS315+CHRS316+CHRS317+CHRS318+CHRS319+CHRS320+CHRS321+CHRS322+CHRS323+CHRS324+CHRS325+CHRS326+CHRS327+CHRS328+CHRS329+CHRS330+CHRS331+CHRS332+CHRS333+CHRS334+CHRS335+CHRS336+CHRS337+CHRS338+CHRS339+CHRS340+CHRS341+CHRS342+CHRS343+CHRS344+CHRS345+CHRS346+CHRS347+CHRS348+CHRS349+CHRS350+CHRS351+CHRS352+CHRS353+CHRS354+CHRS355+CHRS356+CHRS357+CHRS358+CHRS359+CHRS360+CHRS361+CHRS362+CHRS363+CHRS364+CHRS365+CHRS366+CHRS367+CHRS368+CHRS369+CHRS370+CHRS371+CHRS372+CHRS373+CHRS374+CHRS375+CHRS376+CHRS377+CHRS378+CHRS379+CHRS380+CHRS381+CHRS382+CHRS383+CHRS384+CHRS385+CHRS386+CHRS387+CHRS388+CHRS389+CHRS390+CHRS391+CHRS392+CHRS393+CHRS394+CHRS395+CHRS396+CHRS397+CHRS398+CHRS399+CHRS400+CHRS401+CHRS402+CHRS403+CHRS404+CHRS405+CHRS406+CHRS407+CHRS408+CHRS409+CHRS410+CHRS411+CHRS412+CHRS413+CHRS414+CHRS415+CHRS416+CHRS417+CHRS418+CHRS419+CHRS420+CHRS421+CHRS422+CHRS423+CHRS424+CHRS425+CHRS426+CHRS427+CHRS428+CHRS429+CHRS430+CHRS431+CHRS432+CHRS433+CHRS434+CHRS435+CHRS436+CHRS437+CHRS438+CHRS439+CHRS440+CHRS441+CHRS442+CHRS443+CHRS444+CHRS445+CHRS446+CHRS447+CHRS448+CHRS449+CHRS450+CHRS451+CHRS452+CHRS453+CHRS454+CHRS455+CHRS456+CHRS457+CHRS458+CHRS459+CHRS460+CHRS461+CHRS462+CHRS463+CHRS464+CHRS465+CHRS466+CHRS467+CHRS468+CHRS469+CHRS470+CHRS471+CHRS472+CHRS473+CHRS474+CHRS475+CHRS476+CHRS477+CHRS478+CHRS479+CHRS480+CHRS481+CHRS482+CHRS483+CHRS484+CHRS485+CHRS486+CHRS487+CHRS488+CHRS489+CHRS490+CHRS491+CHRS492+CHRS493+CHRS494+CHRS495+CHRS496+CHRS497+CHRS498+CHRS499+CHRS500+CHRS501+CHRS502+CHRS503+CHRS504+CHRS505+CHRS506+CHRS507+CHRS508+CHRS509+CHRS510+CHRS511+CHRS512+CHRS513+CHRS514+CHRS515+CHRS516+CHRS517+CHRS518+CHRS519+CHRS520+CHRS521+CHRS522+CHRS523+CHRS524+CHRS525+CHRS526+CHRS527+CHRS528+CHRS529+CHRS530+CHRS531+CHRS532+CHRS533+CHRS534+CHRS535+CHRS536+CHRS537+CHRS538+CHRS539+CHRS540+CHRS541+CHRS542+CHRS543+CHRS544+CHRS545+CHRS546+CHRS547+CHRS548+CHRS549+CHRS550+CHRS551+CHRS552+CHRS553+CHRS554+CHRS555+CHRS556+CHRS557+CHRS558+CHRS559+CHRS560+CHRS561+CHRS562+CHRS563+CHRS564+CHRS565+CHRS566+CHRS567+CHRS568+CHRS569+CHRS570+CHRS571+CHRS572+CHRS573+CHRS574+CHRS575+CHRS576+CHRS577+CHRS578+CHRS579+CHRS580+CHRS581+CHRS582+CHRS583+CHRS584+CHRS585+CHRS586+CHRS587+CHRS588+CHRS589+CHRS590+CHRS591+CHRS592+CHRS593+CHRS594+CHRS595+CHRS596+CHRS597+CHRS598+CHRS599+CHRS600+CHRS601+CHRS602+CHRS603+CHRS604+CHRS605+CHRS606+CHRS607+CHRS608+CHRS609+CHRS610+CHRS611+CHRS612+CHRS613+CHRS614+CHRS615+CHRS616+CHRS617+CHRS618+CHRS619+CHRS620+CHRS621+CHRS622+CHRS623+CHRS624+CHRS625+CHRS626+CHRS627+CHRS628+CHRS629+CHRS630+CHRS631+CHRS632+CHRS633+CHRS634+CHRS635+CHRS636+CHRS637+CHRS638+CHRS639+CHRS640+CHRS641+CHRS642+CHRS643+CHRS644+CHRS645+CHRS646+CHRS647+CHRS648+CHRS649+CHRS650+CHRS651+CHRS652+CHRS653+CHRS654+CHRS655+CHRS656+CHRS657+CHRS658+CHRS659+CHRS660+CHRS661+CHRS662+CHRS663+CHRS664+CHRS665+CHRS666+CHRS667+CHRS668+CHRS669+CHRS670+CHRS671+CHRS672+CHRS673+CHRS674+CHRS675+CHRS676+CHRS677+CHRS678+CHRS679+CHRS680+CHRS681+CHRS682+CHRS683+CHRS684+CHRS685+CHRS686+CHRS687+CHRS688+CHRS689+CHRS690+CHRS691+CHRS692+CHRS693+CHRS694+CHRS695+CHRS696+CHRS697+CHRS698+CHRS699+CHRS700+CHRS701+CHRS702+CHRS703+CHRS704+CHRS705+CHRS706+CHRS707+CHRS708+CHRS709+CHRS710+CHRS711+CHRS712+CHRS713+CHRS714+CHRS715+CHRS716+CHRS717+CHRS718+CHRS719+CHRS720+CHRS721+CHRS722+CHRS723+CHRS724+CHRS725+CHRS726+CHRS727+CHRS728+CHRS729+CHRS730+CHRS731+CHRS732+CHRS733+CHRS734+CHRS735+CHRS736+CHRS737+CHRS738+CHRS739+CHRS740+CHRS741+CHRS742+CHRS743+CHRS744+CHRS745+CHRS746+CHRS747+CHRS748+CHRS749+CHRS750+CHRS751+CHRS752+CHRS753+CHRS754+CHRS755+CHRS756+CHRS757+CHRS758+CHRS759+CHRS760+CHRS761+CHRS762+CHRS763+CHRS764+CHRS765+CHRS766+CHRS767+CHRS768+CHRS769+CHRS770+CHRS771+CHRS772+CHRS773+CHRS774+CHRS775+CHRS776+CHRS777+CHRS778+CHRS779+CHRS780+CHRS781+CHRS782+CHRS783+CHRS784+CHRS785+CHRS786+CHRS787+CHRS788+CHRS789+CHRS790+CHRS791+CHRS792+CHRS793+CHRS794+CHRS795+CHRS796+CHRS797+CHRS798+CHRS799+CHRS800+CHRS801+CHRS802+CHRS803+CHRS804+CHRS805+CHRS806+CHRS807+CHRS808+CHRS809+CHRS810+CHRS811+CHRS812+CHRS813+CHRS814+CHRS815+CHRS816+CHRS817+CHRS818+CHRS819+CHRS820+CHRS821+CHRS822+CHRS823+CHRS824+CHRS825+CHRS826+CHRS827+CHRS828+CHRS829+CHRS830+CHRS831+CHRS832+CHRS833+CHRS834+CHRS835+CHRS836+CHRS837+CHRS838+CHRS839+CHRS840+CHRS841+CHRS842+CHRS843+CHRS844+CHRS845+CHRS846+CHRS847+CHRS848+CHRS849+CHRS850+CHRS851+CHRS852+CHRS853+CHRS854+CHRS855+CHRS856+CHRS857+CHRS858+CHRS859+CHRS860+CHRS861+CHRS862+CHRS863+CHRS864+CHRS865+CHRS866+CHRS867+CHRS868+CHRS869+CHRS870+CHRS871+CHRS872+CHRS873+CHRS874+CHRS875+CHRS876+CHRS877+CHRS878+CHRS879+CHRS880+CHRS881+CHRS882+CHRS883+CHRS884+CHRS885+CHRS886+CHRS887+CHRS888+CHRS889+CHRS890+CHRS891+CHRS892+CHRS893+CHRS894+CHRS895+CHRS896+CHRS897+CHRS898+CHRS899+CHRS900+CHRS901+CHRS902+CHRS903+CHRS904+CHRS905+CHRS906+CHRS907+CHRS908+CHRS909+CHRS910+CHRS911+CHRS912+CHRS913+CHRS914+CHRS915+CHRS916+CHRS917+CHRS918+CHRS919+CHRS920+CHRS921+CHRS922+CHRS923+CHRS924+CHRS925+CHRS926+CHRS927+CHRS928+CHRS929+CHRS930+CHRS931+CHRS932+CHRS933+CHRS934+CHRS935+CHRS936+CHRS937+CHRS938+CHRS939+CHRS940+CHRS941+CHRS942+CHRS943+CHRS944+CHRS945+CHRS946+CHRS947+CHRS948+CHRS949+CHRS950+CHRS951+CHRS952+CHRS953+CHRS954+CHRS955+CHRS956+CHRS957+CHRS958+CHRS959+CHRS960+CHRS961+CHRS962+CHRS963+CHRS964+CHRS965+CHRS966+CHRS967+CHRS968+CHRS969+CHRS970+CHRS971+CHRS972+CHRS973+CHRS974+CHRS975+CHRS976+CHRS977+CHRS978+CHRS979+CHRS980+CHRS981+CHRS982+CHRS983+CHRS984+CHRS985+CHRS986+CHRS987+CHRS988+CHRS989+CHRS990+CHRS991+CHRS992+CHRS993+CHRS994+CHRS995+CHRS996+CHRS997+CHRS998+CHRS999+CHRS1000+CHRS1001+CHRS1002+CHRS1003+CHRS1004+CHRS1005+CHRS1006+CHRS1007+CHRS1008+CHRS1009+CHRS1010+CHRS1011+CHRS1012+CHRS1013+CHRS1014+CHRS1015+CHRS1016+CHRS1017+CHRS1018+CHRS1019+CHRS1020+CHRS1021+CHRS1022+CHRS1023+CHRS1024+CHRS1025+CHRS1026+CHRS1027+CHRS1028+CHRS1029+CHRS1030+CHRS1031+CHRS1032+CHRS1033+CHRS1034+CHRS1035+CHRS1036+CHRS1037+CHRS1038+CHRS1039+CHRS1040+CHRS1041+CHRS1042+CHRS1043+CHRS1044+CHRS1045+CHRS1046+CHRS1047+CHRS1048+CHRS1049+CHRS1050+CHRS1051+CHRS1052+CHRS1053+CHRS1054+CHRS1055+CHRS1056+CHRS1057+CHRS1058+CHRS1059+CHRS1060+CHRS1061+CHRS1062+CHRS1063+CHRS1064+CHRS1065+CHRS1066+CHRS1067+CHRS1068+CHRS1069+CHRS1070+CHRS1071+CHRS1072+CHRS1073+CHRS1074+CHRS1075+CHRS1076+CHRS1077+CHRS1078+CHRS1079+CHRS1080+CHRS1081+CHRS1082+CHRS1083+CHRS1084+CHRS1085+CHRS1086+CHRS1087+CHRS1088+CHRS1089+CHRS1090+CHRS1091+CHRS1092+CHRS1093+CHRS1094+CHRS1095+CHRS1096+CHRS1097+CHRS1098+CHRS1099+CHRS1100+CHRS1101+CHRS1102+CHRS1103+CHRS1104+CHRS1105+CHRS1106+CHRS1107+CHRS1108+CHRS1109+CHRS1110+CHRS1111+CHRS1112+CHRS1113+CHRS1114+CHRS1115+CHRS1116+CHRS1117+CHRS1118+CHRS1119+CHRS1120+CHRS1121+CHRS1122+CHRS1123+CHRS1124+CHRS1125+CHRS1126+CHRS1127+CHRS1128+CHRS1129+CHRS1130+CHRS1131+CHRS1132+CHRS1133+CHRS1134+CHRS1135+CHRS1136+CHRS1137+CHRS1138+CHRS1139+CHRS1140+CHRS1141+CHRS1142+CHRS1143+CHRS1144+CHRS1145+CHRS1146+CHRS1147+CHRS1148+CHRS1149+CHRS1150+CHRS1151+CHRS1152+CHRS1153+CHRS1154+CHRS1155+CHRS1156+CHRS1157+CHRS1158+CHRS1159+CHRS1160+CHRS1161+CHRS1162+CHRS1163+CHRS1164+CHRS1165+CHRS1166+CHRS1167+CHRS1168+CHRS1169+CHRS1170+CHRS1171+CHRS1172+CHRS1173+CHRS1174+CHRS1175+CHRS1176+CHRS1177+CHRS1178+CHRS1179+CHRS1180+CHRS1181+CHRS1182+CHRS1183+CHRS1184+CHRS1185+CHRS1186+CHRS1187+CHRS1188+CHRS1189+CHRS1190+CHRS1191+CHRS1192+CHRS1193+CHRS1194+CHRS1195+CHRS1196+CHRS1197+CHRS1198+CHRS1199+CHRS1200+CHRS1201+CHRS1202+CHRS1203+CHRS1204+CHRS1205+CHRS1206+CHRS1207+CHRS1208+CHRS1209+CHRS1210+CHRS1211+CHRS1212+CHRS1213+CHRS1214+CHRS1215+CHRS1216+CHRS1217+CHRS1218+CHRS1219+CHRS1220+CHRS1221+CHRS1222+CHRS1223+CHRS1224+CHRS1225+CHRS1226+CHRS1227+CHRS1228+CHRS1229+CHRS1230+CHRS1231+CHRS1232+CHRS1233+CHRS1234+CHRS1235+CHRS1236+CHRS1237+CHRS1238+CHRS1239+CHRS1240+CHRS1241+CHRS1242+CHRS1243+CHRS1244+CHRS1245+CHRS1246+CHRS1247+CHRS1248+CHRS1249+CHRS1250+CHRS1251+CHRS1252+CHRS1253+CHRS1254+CHRS1255+CHRS1256+CHRS1257+CHRS1258+CHRS1259+CHRS1260+CHRS1261+CHRS1262+CHRS1263+CHRS1264+CHRS1265+CHRS1266+CHRS1267+CHRS1268+CHRS1269+CHRS1270+CHRS1271+CHRS1272+CHRS1273+CHRS1274+CHRS1275+CHRS1276+CHRS1277+CHRS1278+CHRS1279+CHRS1280+CHRS1281+CHRS1282+CHRS1283+CHRS1284+CHRS1285+CHRS1286+CHRS1287+CHRS1288+CHRS1289+CHRS1290+CHRS1291+CHRS1292+CHRS1293+CHRS1294+CHRS1295+CHRS1296+CHRS1297+CHRS1298+CHRS1299+CHRS1300+CHRS1301+CHRS1302+CHRS1303+CHRS1304+CHRS1305+CHRS1306+CHRS1307+CHRS1308+CHRS1309+CHRS1310+CHRS1311+CHRS1312+CHRS1313+CHRS1314+CHRS1315+CHRS1316+CHRS1317+CHRS1318+CHRS1319+CHRS1320+CHRS1321+CHRS1322+CHRS1323+CHRS1324+CHRS1325+CHRS1326+CHRS1327+CHRS1328+CHRS1329+CHRS1330+CHRS1331+CHRS1332+CHRS1333+CHRS1334+CHRS1335+CHRS1336+CHRS1337+CHRS1338+CHRS1339+CHRS1340+CHRS1341+CHRS1342+CHRS1343+CHRS1344+CHRS1345+CHRS1346+CHRS1347+CHRS1348+CHRS1349+CHRS1350+CHRS1351+CHRS1352+CHRS1353+CHRS1354+CHRS1355+CHRS1356+CHRS1357+CHRS1358+CHRS1359+CHRS1360+CHRS1361+CHRS1362+CHRS1363+CHRS1364+CHRS1365+CHRS1366+CHRS1367+CHRS1368+CHRS1369+CHRS1370+CHRS1371+CHRS1372+CHRS1373+CHRS1374+CHRS1375+CHRS1376+CHRS1377+CHRS1378+CHRS1379+CHRS1380+CHRS1381+CHRS1382+CHRS1383+CHRS1384+CHRS1385+CHRS1386+CHRS1387+CHRS1388+CHRS1389+CHRS1390+CHRS1391+CHRS1392+CHRS1393+CHRS1394+CHRS1395+CHRS1396+CHRS1397+CHRS1398+CHRS1399+CHRS1400+CHRS1401+CHRS1402+CHRS1403+CHRS1404+CHRS1405+CHRS1406+CHRS1407+CHRS1408+CHRS1409+CHRS1410+CHRS1411+CHRS1412+CHRS1413+CHRS1414+CHRS1415+CHRS1416+CHRS1417+CHRS1418+CHRS1419+CHRS1420+CHRS1421+CHRS1422+CHRS1423+CHRS1424+CHRS1425+CHRS1426+CHRS1427+CHRS1428+CHRS1429+CHRS1430+CHRS1431+CHRS1432+CHRS1433+CHRS1434+CHRS1435+CHRS1436+CHRS1437+CHRS1438+CHRS1439+CHRS1440+CHRS1441+CHRS1442+CHRS1443+CHRS1444+CHRS1445+CHRS1446+CHRS1447+CHRS1448+CHRS1449+CHRS1450+CHRS1451+CHRS1452+CHRS1453+CHRS1454+CHRS1455+CHRS1456+CHRS1457+CHRS1458+CHRS1459+CHRS1460+CHRS1461+CHRS1462+CHRS1463+CHRS1464+CHRS1465+CHRS1466+CHRS1467+CHRS1468+CHRS1469+CHRS1470+CHRS1471+CHRS1472+CHRS1473+CHRS1474+CHRS1475+CHRS1476+CHRS1477+CHRS1478+CHRS1479+CHRS1480+CHRS1481+CHRS1482+CHRS1483+CHRS1484+CHRS1485+CHRS1486+CHRS1487+CHRS1488+CHRS1489+CHRS1490+CHRS1491+CHRS1492+CHRS1493+CHRS1494+CHRS1495+CHRS1496+CHRS1497+CHRS1498+CHRS1499+CHRS1500+CHRS1501+CHRS1502+CHRS1503+CHRS1504+CHRS1505+CHRS1506+CHRS1507+CHRS1508+CHRS1509+CHRS1510+CHRS1511+CHRS1512+CHRS1513+CHRS1514+CHRS1515+CHRS1516+CHRS1517+CHRS1518+CHRS1519+CHRS1520+CHRS1521+CHRS1522+CHRS1523+CHRS1524+CHRS1525+CHRS1526+CHRS1527+CHRS1528+CHRS1529+CHRS1530+CHRS1531+CHRS1532+CHRS1533+CHRS1534+CHRS1535+CHRS1536+CHRS1537+CHRS1538+CHRS1539+CHRS1540+CHRS1541+CHRS1542+CHRS1543+CHRS1544+CHRS1545+CHRS1546+CHRS1547+CHRS1548+CHRS1549+CHRS1550+CHRS1551+CHRS1552+CHRS1553+CHRS1554+CHRS1555+CHRS1556+CHRS1557+CHRS1558+CHRS1559+CHRS1560+CHRS1561+CHRS1562+CHRS1563+CHRS1564+CHRS1565+CHRS1566+CHRS1567+CHRS1568+CHRS1569+CHRS1570+CHRS1571+CHRS1572+CHRS1573+CHRS1574+CHRS1575+CHRS1576+CHRS1577+CHRS1578+CHRS1579+CHRS1580+CHRS1581+CHRS1582+CHRS1583+CHRS1584+CHRS1585+CHRS1586+CHRS1587+CHRS1588+CHRS1589+CHRS1590+CHRS1591+CHRS1592+CHRS1593+CHRS1594+CHRS1595+CHRS1596+CHRS1597+CHRS1598+CHRS1599+CHRS1600+CHRS1601+CHRS1602+CHRS1603+CHRS1604+CHRS1605+CHRS1606+CHRS1607+CHRS1608+CHRS1609+CHRS1610+CHRS1611+CHRS1612+CHRS1613+CHRS1614+CHRS1615+CHRS1616+CHRS1617+CHRS1618+CHRS1619+CHRS1620+CHRS1621+CHRS1622+CHRS1623+CHRS1624+CHRS1625+CHRS1626+CHRS1627+CHRS1628+CHRS1629+CHRS1630+CHRS1631+CHRS1632+CHRS1633+CHRS1634+CHRS1635+CHRS1636+CHRS1637+CHRS1638+CHRS1639+CHRS1640+CHRS1641+CHRS1642+CHRS1643+CHRS1644+CHRS1645+CHRS1646+CHRS1647+CHRS1648+CHRS1649+CHRS1650+CHRS1651+CHRS1652+CHRS1653+CHRS1654+CHRS1655+CHRS1656+CHRS1657+CHRS1658+CHRS1659+CHRS1660+CHRS1661+CHRS1662+CHRS1663+CHRS1664+CHRS1665+CHRS1666+CHRS1667+CHRS1668+CHRS1669+CHRS1670+CHRS1671+CHRS1672+CHRS1673+CHRS1674+CHRS1675+CHRS1676+CHRS1677+CHRS1678+CHRS1679+CHRS1680+CHRS1681+CHRS1682+CHRS1683+CHRS1684+CHRS1685+CHRS1686+CHRS1687+CHRS1688+CHRS1689+CHRS1690+CHRS1691+CHRS1692+CHRS
```

ATARI VCS OWNERS INCREASE THE PLAYING POWER OF YOUR ATARI 2600 VCS BY UP TO 50 TIMES



THE NEXT DIMENSION IN VIDEO GAMES® WHAT IS THE SUPERCHARGER?

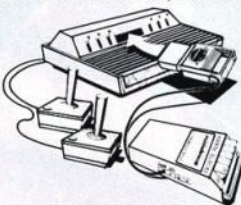
The Supercharger plugs directly into the cartridge slot of your Atari VCS to increase its game playing power. With special digital electronics, it multiplies the VCS RAM memory by 49 times, from 128 to 6272 bytes. The Supercharger is unique, in that it can accept programs that have been recorded on standard audio cassette tapes. These are easier and less expensive to develop and market than plug-in cartridges and cost considerably less! The Supercharger is supplied with a standard cable and jack plug which will plug into the earphone socket of any domestic cassette tape recorder. Supercharger lets you play games with high resolution graphics, faster action, and far more complexity. With the extra memory provided by the Supercharger you will now be able to play superior games which could not normally run on an unadapted Atari VCS because of its memory limitations.

MULTI LOAD GAMES - For added complexity and depth
Cassette tape allows Starpath to offer unique Multi Load games. Games like Dragonstomper and Escape from the Mindmaster include several 'loads' on one cassette. When you have finished the first part of a game, you can then load another program giving a different screen or type of game play, thus continuing the game in several distinct parts. This feature is particularly useful in adventure type games. Multi Load games offer complexity and depth that no conventional ROM cartridge game can currently compete with.

FREE CASSETTE - Phaser Patrol (Two screen game)
The Supercharger comes with a highly acclaimed and award winning Phaser Patrol game, and costs only £19.00 including VAT.

Details of all the games are given below. For further details, complete and return the coupon below.

£19



PHASER PATROL (FREE!)

Phaser Patrol is a single load game which is FREE with the Supercharger unit. A space game, it has two screens, one featuring the intergalactic battlefield, (below left), and the other showing a Sector Map (below right). The game begins when the devious 'Dracons' launch a surprise attack and you belong to the force which must prevent them from reaching earth. The sector map enables you to warp-hop from one sector to another and it also tells you in what areas the Dracon ships are, so you will need to refer to it before you go into battle. As well as telling you the location of the Dracons, the map shows you where your starbases are, these can bail you out if you get into any trouble. When you have decided on the sector of Dracons to attack, you can go on to the second screen, the battlefield. On this screen you have a view of the vast galaxy ahead and a control panel to keep you informed of your position. A one player game, Phaser Patrol is a highly detailed action packed cassette.



MUTANTS FROM SPACE

Single Load action from Starpath, just as soon as you begin this game you will be under attack. Your task is to vaporize the mutant warriors before they overrun your home planet. Up to four can play and the screen keeps track of the highest score. As well as having nine difficulty levels and two speeds, Communist Mutants from Space (it's full title), has got several game cassette providing a variety of options. The real skill in this game however, is winning without using the special features that it offers you!

Price: £8.65 + VAT = £9.95



FIREBALL

You are a juggler, and able to juggle anything from china plates to daggers! Your task in this Single Load game is to smash wall after wall of blocks as you juggle with red hot FIREBALLS! When the ball comes down from the top of your screen, catch it, and then release it back at the wall of blocks. You can score up to a million points! And, if you get to proficient at one pattern of blocks, there are another four to choose from! Up to 4 players can take part in this game and up to 6 fireballs can appear on the screen at once. Be sure you don't get burned!

Price: £8.65 + VAT = £9.95



KILLER SATELLITES

You are the only test pilot of the one rocket ship that can protect the earth from an alien attack of molten metal. The invasion has started, have you the courage and skill to save mankind? A Single Load game, Killer Satellites is for 1 player featuring 2 difficulty settings as well as a 'rapid fire' mode. Other features include: a fuel level indicator; a laser overheat monitor which indicates the temperature of your gun; a global radar scanner and an energy barrier, which can be used to protect you from some of the alien projectiles. . . . but not all of them!

Price: £8.65 + VAT = £9.95



SUICIDE MISSION

Your mission in this game is to shrink down, smaller than a speck of dust, to do battle with a deadly killer virus deep within a human body. Equipped with a microscopic submarine, head for an infection, perilously close to the heart, and towards a fight where you are heavily outnumbered. This is arterial warfare at its finest. Fire at one of the many germs, and it divides into two. Fire again and the numbers increase once more. A 1 or 2 player game featuring protective shields and two different shooting styles, Suicide Mission has three difficulty options.

Price: £8.65 + VAT = £9.95



DRAGONSTOMPER

Dragonstomper is one of Starpath's Multi-Load cassettes. An adventure game, you've been swept through a time tunnel, right back to the age of warlocks and wizards. Your mission is to find the Amulet of the Druids. There are clues, but not all easy ones. There are peaceful lakes and forests as well as deadly perils and lurking somewhere is a very vengeful dragon. There are many rewards along the way, but few will reach the final goal. The MULTI LOAD feature gives you THREE separate game segments, for longer, more challenging game play.

Price: £8.65 + VAT = £9.95



ESCAPE/MINDMASTER

A Multi-Load cassette, your task in this game is to escape from the alien Mindmaster's laboratory, where he has held you as a specimen for study. To win your freedom, you must pass through six 3-D mazes, with each of them being more complex than the last. The first 5 mazes have problems to solve and some surprise intelligence tests. The sixth maze is something special! As this game is too complex to load into your Atari at one time, it loads in FOUR different sections, a feature of the extra play power of the Starpath MULTI LOAD cassettes.

Price: £8.65 + VAT = £9.95

VIDEO GAME CLUB

In a fast moving market like video games, it is difficult to keep up to date with all the developments that take place. With new programmes and accessories being introduced at a fast rate by several different manufacturers, it is impossible to get all the information you require from one manufacturer alone. It is for this reason, that we have set up owners clubs for the more popular video games and home computers, to keep you fully up to date with what is going on with your particular machine. As far as we know, Silica Shop are the only company to offer such clubs, but that is not surprising since we are the specialists. We currently have FREE clubs for the Atari VCS, Atari 400/800 home computers, and Mattel Intellivision. Soon we will have clubs for Colecovision, Aquarius and Vectrex. So if you own one of these machines, fill in the coupon opposite, and we will enrol you FREE OF CHARGE in the club relevant to your computer or video game.

FREE LITERATURE

FREE LITERATURE - Please send me your FREE LITERATURE and catalogues on the following items:

OWNERS CLUB - I already own the following products, please enrol me in your FREE club:

Mr/Mrs/Miss: Initials: Surname:

Address:

.....

.....

Postcode: BIGK 0484

FREE LITERATURE

01-309 1111 SILICA SHOP

SILICA SHOP LIMITED, Dept BIGK 0484,

1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

Telephone: 01-309 1111 or 01-301 1111

PSS, creating programs

Moon-base Alpha

Moon-base Alpha

A race against time, fast exciting arcade action.
£6.95



ARCADE ACTION for ORIC 1

Light Cycle

Race your Light Cycle on the infamous grid. Fast action all the way. £6.95



ARCADE ACTION for BBC MICRO.

PSS

PSS SOFTWARE

FOR INSTANT CREDIT CARD SALES TEL (0203) 667556. SEND CHEQUE OR P.O.
TO P.S.S. 452 STONEY STANTON RD. COVENTRY CV6 5DG.
TRADE ENQUIRIES CONTACT JOHN FLETCHER, COVENTRY (0203) 81346

for SPECTRUM, ZX81, ORIC 1, COMMODORE 64 & BBC MICRO.



Blade Alley

Six different screens of incredible 3D arcade action. CURRAH μ SPEECH compatible. 48K £5.95

PSS, programs for your machine and soon Electron and Memotech MTX



Metroblitz

Defend your city against an onslaught of suicidal aliens. £7.95



SPECTRUM

MCDER II	9.95
HOPPER 16K or 48K	5.95
LIGHT CYCLE	5.95
ELEKTROSTORM	5.95
DEEP SPACE	5.95
MAZE DEATH RACE	4.95
PANIC	5.95
GHOST HUNT	4.95
KRAZY KONG	5.95
THE GUARDIAN	5.95

ZX81

GAUNTLET	5.95
TAI	4.95
MCDER II	8.95
MAZE DEATH RACE	3.95
KRAZY KONG	3.95
HOPPER	3.95

ORIC 1

CENTPEDE	6.95
HOPPER	6.95
LIGHT CYCLE	6.95
INVADERS	5.95
ULTRA	6.95
ORICMON	8.95
GAUNTLET	6.95

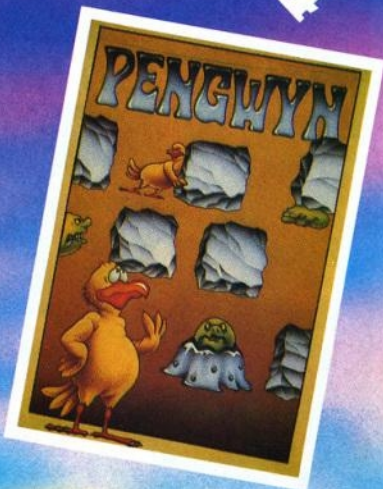
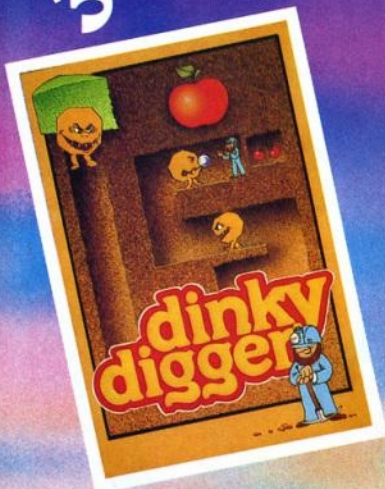
COMMODORE 64

MOBY DICK	7.95
NEOCLYPS	7.95
METRO BLITZ	7.95
KRYSTALS OF ZONG	7.95
COSMIC SPLIT	7.95
EASY TUTOR	7.95

BBC MICRO

LIGHT CYCLE	6.95
CENTPEDE	6.95
INVADERS	6.95
SENTINEL	6.95

3 from POSTERN for '84



2

DINKY DIGGER

It's super-fast, furious and as mean as they come.
(Spectrum 48K)

1

XANAGRAMS

Over 5,000 permutations in this game of skill for all ages.
(Spectrum 16K/48K BBC 'B' Electron CBM 64)

3

PENGWYN

As the temperature rises, strange happenings begin in Pengwyn's frozen world.
(Spectrum 48K BBC 'B' Electron CBM64 Spectra video).

POSTERN

Available nationally from specialist retailers and all good multiples.

Please write quantities required in boxes provided and state computer type.

Name _____
Address _____

WM-3-84

POST TO: Postern Ltd., PO. Box 2, Andoversford, Cheltenham, Glos GL54 5SW. Postern is always on the look out for any new games you might have developed.



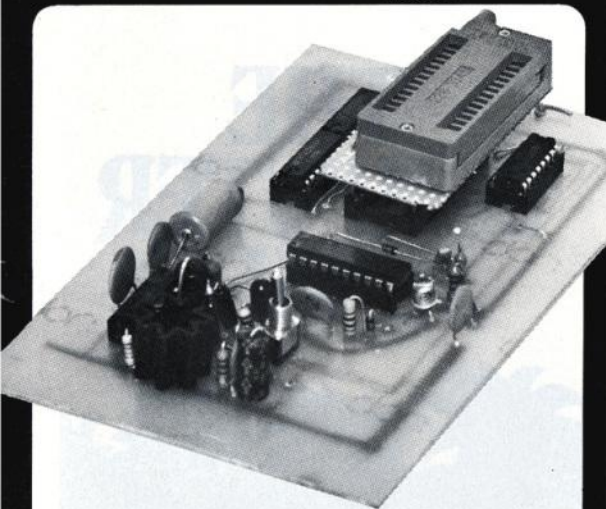
POSTERN

Total £ _____ or Access No. _____

Please Postern People post me:

1	Xanagrams
2	Dinky Digger
3	Pengwyn

Price £6.95 each
(£7.95 for overseas mail order)



of these VIAs anyway.)

After seven or fourteen minutes, depending on whether you use the 2764 or 128, the program asks you to disable S1 to switch off the 21V power to the ZIF. YOU MUST DO THIS BEFORE REMOVING THE EPROM!!!! Otherwise you may find yourself needing a new EPROM!

Corrupt Option

Note that when programming an EPROM, a copy of RAM from &3000 onwards is burnt into the EPROM in the ZIF. In the case of a 2764, then, from &3000 to &4FFF are burnt in. Its up to you to "LOAD or otherwise get the correct data into this area before running the Programming Program.

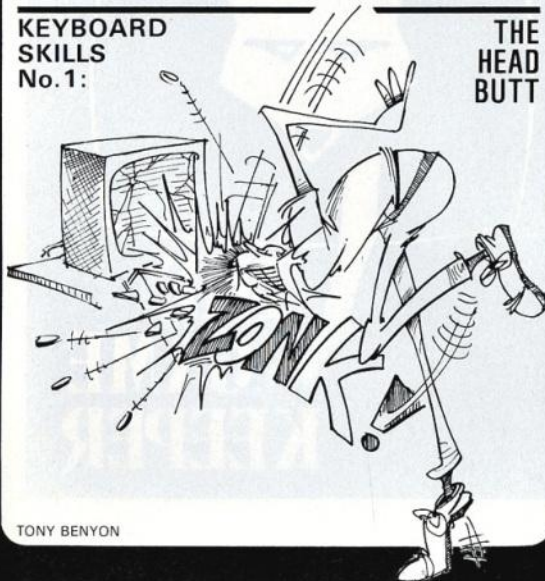
Remember that using option B will corrupt this area, so don't painstakingly load

several files into the buffer area, then decide to see what's on the EPROM already — THEN use option C to burn the buffer area in — otherwise nothing will happen! If you want to be sure that the EPROM currently in the ZIF is erased just before programming it, use option A which doesn't corrupt the buffer area.

After programming, you might like to use option D which reads in from the EPROM byte by byte and compares each byte with the corresponding one in the buffer. Any discrepancy is announced together with the addresses of the byte that went wrong.

That just about wraps up the EPROM epic for this month. Next month I'll be telling you how the BBC talks to its sideways ROMs and how to make your own!

KEYBOARD SKILLS No.1:



TONY BENYON

THE
HEAD
BUTT

INCENTIVE

PRESENTS...

SPLAT!

FOR THE COMMODORE 64 AND 48K SPECTRUM



ONE OF THE MOST ORIGINAL
& COMPELLING ARCADE GAMES
EVER PRODUCED !!

£500 WINNER! James Tant from Wokingham who scored 112,930!!!! (on visiting our offices to verify his high scoring ability - he scored even more!)

What they say:

"SPLAT" is one of the most addictive games I have ever played on the 48K SPECTRUM. It is certainly the most original!"

Computer & Video Games

"Highly recommended"

Crash Review

SPECTRUM 48K £5.50 - COMMODORE 64 £6.50



THE KET TRILOGY

MOUNTAINS OF KET
"A professional game in a competitive genre, especially if you want value for money, I can heartily recommend this adventure."

HCW REVIEW

★★★★★HCW NEW RELEASE

First get to the mountain...

MOUNTAINS OF KET

48K SPECTRUM £5.50

TEMPLE OF VRAN

48K SPECTRUM £5.50

TEMPLE OF VRAN

NEW An even greater challenge just released

1984

A GAME OF
GOVERNMENT MANAGEMENT



1984

THE HIGHLY
ACCLAIMED GAME OF
ECONOMIC SURVIVAL

THE BRITISH ECONOMY WITH YOU
AT THE CONTROLS! HOW MANY
YEARS WILL YOU LAST?

★ 5 STAR RATING HCW 31/1/84 ★

BBC "B"

£6.50

SPECTRUM 48K £5.50

NEW FOR
THE BBC

MILLIONAIRE

From a small humble home to a magnificent estate? Take on one of life's little challenges & become a millionaire! Start up a Software Co, Buy, sell, Advertise, Deal with Honest Harry, Full Screen Graphic Representation of your current residence, + many other features. A compulsive game that grips you.

SPECTRUM 48K £5.50



OUR PROGRAMS ARE AVAILABLE FROM ALL LEADING DEALERS NATIONWIDE. In case of difficulty please use the coupon below.

ORDER FORM



Please send me the titles as indicated by 1st class post. I enclose cheque/P.O. for £..... or debit my Access/Visa Account

48K SPECTRUM
£5.50 EACH
SPLAT ☐
MOUNTAINS OF KET ☐
TEMPLE OF VRAN ☐
1984 ☐
MILLIONAIRE ☐

COMMODORE
64
£6.50
SPLAT ☐
BBC (B/SERIES 1) ☐
£6.50
1984 ☐

No

Name

Address

INCENTIVE

INCENTIVE SOFTWARE LTD, 54 London Street,
Reading RG1 4SQ Tel: Reading (0734) 591678

MAIL ORDER ADVERTISING

British Code of Advertising Practice

Advertisements in this publication are required to conform to the British Code of Advertising Practice. In respect of mail order advertisements where money is paid in advance, the code requires advertisers to fulfil orders within 28 days, unless a longer delivery period is stated. Where goods are returned undamaged within seven days, the purchaser's money must be refunded. Please retain proof of postage/despatch, as this may be needed.

Mail Order Protection Scheme

If you order goods from Mail Order advertisements in this magazine and pay by post in advance of delivery, BIG K will consider you for compensation if the Advertiser should become insolvent or bankrupt, provided:

- (1) You have not received the goods or had your money returned; and
- (2) You write to the Publisher of BIG K summarising the situation not earlier than 28 days from the day you sent your order and not later than two months from that day.

Please do not wait until the last moment to inform us. When you write, we will tell you how to make your claims and what evidence of payment is required.

We guarantee to meet claims from readers made in accordance with the above procedure as soon as possible after the Advertiser has been declared bankrupt or insolvent.

This guarantee covers only advance payment sent in direct response to an advertisement in this magazine not, for example, payment made in response to catalogues etc., received as a result of answering such advertisements. Classified advertisements are excluded.

GAMER

ATARI • COMMODORE 64
SPECTRUM • VIC 20
DRAGON • MEMOTECH
BBC • SORD M5 • ORIC
EPSON • SANYO • WREN

PLUS A WIDE RANGE OF
SOFTWARE, BOOKS & PERIPHERALS
ALL NOW AVAILABLE AT OUR
NEW STORE AT

71 EAST ST., BRIGHTON

SOFTWARE ALSO AVAILABLE AT OUR
24 GLOUCESTER RD. BRANCH
TEL: 69842

THE COMPUTER JUNGLE~



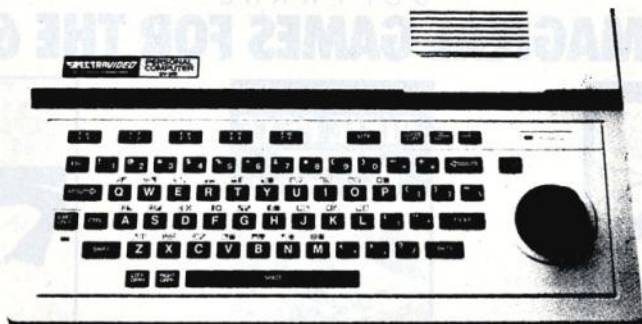
TAMED.



THE GAME KEEPER

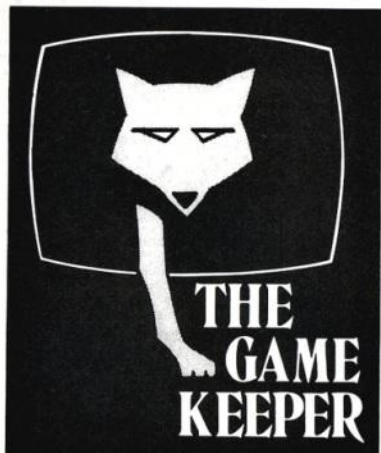
SPECTRAVIDEO 318 AND 328

In our view the best value in home computers today



More than 100 sold to satisfied customers from one store in one month

If you want the finest choice of Spectravideo computers, peripherals and software, contact or call



BY POST:

GAMEKEEPER

FREEPOST BIRMINGHAM B23 5BR

BY PHONE: (24 Hours)

021-384 6108

PERSONAL CALLERS TO:

GAMEKEEPER 1

GRAND FARE, 224 HIGH STREET, ERDINGTON, BIRMINGHAM

GAMEKEEPER 2

LOWCOST, 1062 WARWICK RD, ACOCKS GREEN, BIRMINGHAM

PROBABLY ENGLAND'S LARGEST STOCK OF HOME COMPUTER SOFTWARE
WATCH OUT FOR MORE GAMEKEEPERS SOON!!

**DEALER ENQUIRIES
PHONE
(0438)
316561**

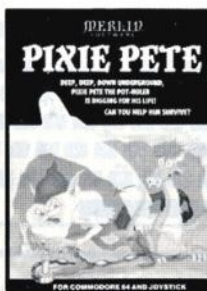


**NEW RELEASE
for the 64!
ORANGE
SQUASH**

3 MAGICAL GAMES FOR THE 64



CRAZY CAVEMAN - Journey back to prehistoric times! A tribe of cave dwellers sends out a hunting party, but the men are scattered when they are ambushed by a huge sabre-toothed tiger! You are one of these hunters: a long way from shelter, you begin the hazardous trek home. On the way there are many dangers, like ROLLING ROCKS, DINOSAURS, DODOS AND PREHISTORIC BIRDS. **£6.50**



PIXIE PETE - Deep, deep down underground, PIXIE PETE the pol-holeer is digging for his survival. You control this dauntless pixie, and must help him dig his own maze to escape from DESMOND THE DRAGON for as long as possible, but if he comes in range, quickly engage your HYDROLIC RAM PUMP to blow him up. If you manage to destroy DESMOND he will return to haunt you as GORGON THE GHOST who causes many problems for PETE. **£6.95**



BLUE MOON - You are the pilot of an intergalactic spacecraft. Your mission is to rescue a sister-ship and her crew who are trapped on a hostile planet and to return with them to the safety of the Blue Moon. However, journeying across the vastness of space there are many hazards to negotiate, such as the deadly BLUE BOUNCERS, COMETS, BELL BIRDS, DROIDS and TECOM ALIENS. **£6.50**

Top prices paid for quality **COMMODORE 64** programs

Games available from all good computer shops or direct from Merlin Software at the address below.

**MERLIN SOFTWARE, BUSINESS AND TECHNOLOGY CENTRE, BESSEMER DRIVE, STEVENAGE, HERTS. SG1 2DX
TELEPHONE (0438) 316561**

ADVERTISEMENT INDEX

AGF Hardware	18	McLothlorien	104
Anirog	32	Merlin	102
Artic	17, 49	Microdeal	61
Audiogenic	IFC	Micromega	2
Big G Software	52	Mirrorsoft	34
Blue Chip Computers	4	Mr Micro	26
BMX	41		
British Micro	7	Ocean	0BC
Cascade	27	Phoenix	23
Consumer Electronics	55	Postern	98
Crystal	16	PSS	96/97
Digital Fantasia	80	Quicksilver	103
DK Tronics	87		
Doctor Soft	10	Ram Electronics	27
Dragon Dungeon	47	Redshift	8/9
Fantasy	64/65	Rowntree (Minty Egg)	40
Galactic	81	R. & R. Software	35
Gamekeeper	100/101		
Gamer	100	Silica Shop	95
Gamesters	54	Silver Soft	46
HMV	60	Software Invasion	31
Incentive	99	Solar Software	54
Llamasoft	IBC	Supersoft	79
Lyversoft	33	Tandy	68/69
		Temptation	54
		Virgin Games	44/45

1984



QUICKSILVA

...THE YEAR OF THE GAME LORDS.

NEW RELEASES!

COMMODORE 64 STING £7.95

Author: **Anton Hinxman**

Hive-cave action!
Bertie Bee needs help
defending the hive. Fight off
the invading swarms, battle
the bees and defend your
Queen!

COMMODORE 64 BUGABOO (THE FLEA) £7.95

Author: **Indescomp**

Itchy action!
Jump your way out of the
caves with Bugaboo the flea
but beware of the fearsome
Dragon as you jump around
the exotic vegetation.

48K SPECTRUM RAYMOND BRIGGS' THE SNOWMAN £6.95

Author: **David Shea**

An enchanting game based
around episodes of Raymond
Briggs' amazingly successful
book.

48K SPECTRUM ANT ATTACK £6.95

Author: **Sandy White**

Battle the Ants in the soft
solid 3D city of Antesch.

48K SPECTRUM DRAGONS BANE £6.95

Authors: **M. Preston,
P. Hunt, R. Rose, D. Moore.**

A mythical graphic
adventure in the dark and
deadly halls of Earthstone
Castle. Battle Dragons,
Vampires, Sphinx, Zombies,
Skeletons, Gryphons and
other legendary beasts to
rescue the beautiful Princess
Paula.

48K SPECTRUM FRED £6.95

Author: **Indescomp**

Action beneath the
Pyramids!
Fearless Fred the Intrapid
Archaeologist searches the
creepy catacombs below the
torrid tomb of 'Tootiecarmon'
for the terrible treasures
amidst monstrous mummies,
ghostly ghosts, bats and rats!

48K SPECTRUM • **TIME GATE** Author: John Hollis £6.95
COMMODORE 64 • **PURPLE TURTLES** Authors: Mark & Richard Moore £7.95
VIC 20 + 3K or 8K RAM • **SKYHAWK** Authors: Steve Lee/Chartec £7.95
DRAGON • **MINED OUT** Authors: I & C Andrew/Incentive £5.95
BBC MODEL • **THE GENERATORS** Author: Dave Mendes £5.95

All titles available from Quicksilver Mail Order
P.O. Box 6, Wimborne Dorset BA21 7PY.

Quicksilver programs are available from: Boots, W.H. Smiths, J. Menzies, Microdealer,
HMV, Hamleys, John Lewis, Computers for All and all reputable
specialist computer stockists.

SEND S.A.E. FOR
FULL COLOUR
CATALOGUE

COMMODORE 64 • SPECTRUM • BBC • ORIC • DRAGON • TANDY

IF YOU THINK YOU'VE GOT THE BETTER OF YOUR COMPUTER, YOU'D BETTER THINK AGAIN....

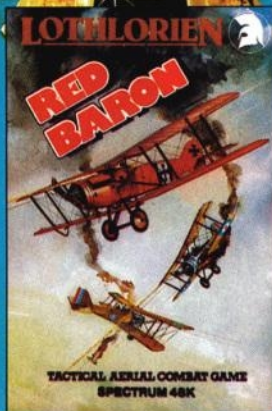
We all enjoy a good action game on our home computers, but after a while doesn't chasing the alien across a screen wear a little thin? That's the time to take on the superior challenge of a Warmaster strategy game — plenty of action, plenty to think about, and plenty of titles to suit every taste.

Take on Warmaster and really put your home computer through its paces.



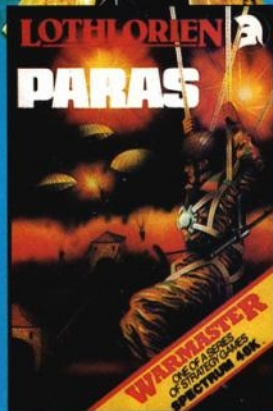
CONFRONTATION

Build-on game that offers a basic format for any modern, non-nuclear conflict. Contains a modern European scenario with facility to create others of your choice using air and land forces. Two-player game.
Spectrum 48K £7.95
BBC-B £7.95



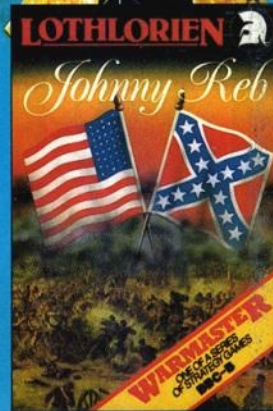
RED BARON

Offers the excitement of arcade action but requires the tactical thought of war games. Pit your biplane against one or two of the Kaiser's aces in this aerial combat game.
Spectrum 48K £5.95



PARAS

Dramatic all-graphics campaign. Your hand-picked force has dropped behind enemy lines to capture a strategic river crossing. Two versions of the game with ten levels of play.
BBC-B £6.95
Spectrum 48K £5.95
Oric 1 48K (coming soon) £6.95

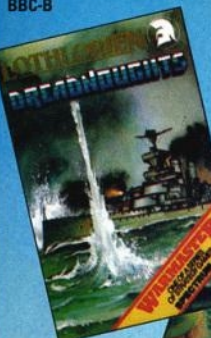


JOHNNY REB

There's still plenty of fight left in the Confederate South as each side selects forces to manoeuvre on a full-graphics battlefield. Play against the computer or challenge a friend.
Spectrum 48K £5.50
Oric 1 48K £6.95
BBC-B £6.95
Dragon 32/Tandy Colour 32K £6.95
Commodore 64 (coming soon) £6.95

DREADNOUGHTS

Suspense-filled high seas drama as the pride of the German Grand Fleet is locked in battle with the Royal Navy. Two-player game.
Spectrum 48K £5.95



BATTLEZONE 2000

Futuristic wargame. Your tanks, missile launchers, infantry etc. have to destroy an all powerful computer-controlled battle machine. Can you save Planet Earth?
BBC-B £6.95

Available from John Menzies, Lighting Dealers and better software shops or clip the coupon for fast delivery.

Please send me (tick box)

Confrontation Spectrum 48K £7.95 ☐
BBC-B £7.95 ☐
Red Baron Spectrum 48K £5.95 ☐
BBC-B £6.95 ☐
Paras Spectrum 48K £5.95 ☐
Oric 1 48K (coming soon) £6.95 ☐

Free colour catalogue listing all Lothlorien games ☐

I enclose a cheque/P.O. for £_____ made payable to M C Lothlorien.

Please debit my Access No. _____ / _____ / _____ Signed _____

Name _____

Address _____

Johnny Reb Spectrum 48K £5.50 ☐
Oric 1 48K £6.95 ☐
BBC-B £6.95 ☐
Dragon 32/Tandy Colour 32K £6.95 ☐
Commodore 64 (coming soon) £6.95 ☐
Dreadnoughts Spectrum 48K £5.95 ☐
Battlezone 2000 BBC-B £6.95 ☐

LOTHLORIEN
the mind stretcher



Send to: M C Lothlorien, Dept. BIG K, 56a Park Lane, Poynton, Cheshire SK12 1AE.
Tel: Poynton (0625) 876642.



METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

A fast and original game for the unexpanded VIC. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago. £5.50

LASER ZONE

Experience Laser Zone – an utterly NEW totally ORIGINAL masterpiece of video games design. Learn to control two spaceships at once! Feel the EXHILARATION as, after long hours of practice, you control the two ships so that they function as a smooth, co-operative team! Feel the raw POWER as you lunge for the electro-bution and BLAST your enemies into expanding clouds of SPACE JUNK!! Feel the humiliation as a carelessly aimed BLAST slams into the side of your last remaining ship!! 8K expansion required. Available for Commodore 64 £7.50 and VIC-20 £6.



MATRIX

Jeff Minter has taken Gridrunner – the game that topped bestseller charts in USA and UK – and created an awesome sequel. Graphically superb, it features multiple screens, new aliens and attack waves, mystery bonuses, renegade humanoids, deflector fields, diagonal tracking, countdown/panic phase and much, much more... Packed into 20 mind-zapping zones and accompanied by incredible sonics. 8K expansion required. Available for Commodore 64 £7.50 and VIC-20 £6.

HOVER BOVVER

A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower! £7.50



ATTACK of the MUTANT CAMELS

Planet earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spitting death camels! Can you fly your tiny manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the humans stronghold! You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome r/v/c action! Available for Commodore 64 £7.50.



REVENGE OF THE MUTANT CAMELS

At last the long awaited sequel to Attack of the Mutant Camels is available. You are controlling a ninety foot high, neutronium shielded, laser spitting death camel, leading a rebellion against your evil Zyxian overlords. The game features beautiful smooth scrolling graphics and no less than 42 different attack waves, more than any game in video history. The challenge of play will last for months as you battle to see what's on the next wave.



GRIDRUNNER

Finally true arcade quality on the unexpanded VIC! Shoot down the segmented DROIDS invading the grid. Beware of the pods and zappers! The awesome speed, sound, and graphics gives you the best blast available for unexpanded VIC. Available for VIC-20 £5.00 Commodore 64 £5.00 Alan 400/800 £7.50



Llamasoft

AWESOME GAMES SOFTWARE

49 MOUNT PLEASANT,
TADLEY, HANTS. RG26 6BN.
TELEPHONE: TADLEY (07356) 4478

All orders add
50p postage and packing

LLAMA.S.O.F.T. GAMES NOW IN BOOTHS,
-LASKYS AND MANY OTHER RETAILERS



Even the pirates can't stop playing these priceless new gems from Ocean!

That's right, even the pirates will be dropping their duplicators to play Moon Alert, to join in the swinging fun with Hunchback, to attack with Android Two, jump for their lives with Pogo, spin themselves dizzy with Chinese Juggler, they'll just crack-up with Eskimo Eddie's Arctic action and there will be no stopping the captain once he gets his hook on Mr. Wimpy that zany burger battle. Don't you miss all the Ocean action get down to your local dealer now and join in the fun and games.

Moon Alert Spectrum 5-90
Hunchback Spectrum, Comm. 64, Oric 6-90
Android Two Commodore 64 6-90
Pogo Spectrum 5-90

ocean

Chinese Juggler
Eskimo Eddie
Mr. Wimpy

Comm. 64 6-90
Spectrum 5-90
Comm. 64, Oric 6-90
Spectrum 5-90

Ocean Software is available from selected branches of: WOOLWORTH, W H SMITH, John Menzies, LASKYS, Rumbelows, Spectrum Shops and all good software dealers. Trade enquiries phone: 061 832 7049.

Ocean Software · Ralli Building · Stanley Street · Manchester M3 5FD · Tel: 061 832 9143